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Notice is hereby given that the services of Clayton L. Smythe as circulation manager of this publication have been discontinued by us and that he does not in any way represent the company or any of its publications.

Watch Your Subscription's Expiration

Owing to the typically American habit of procrastination, a relatively large proportion of the subscribers to most magazines delay sending in their renewals until their subscriptions have actually lapsed, and discontinuance is threatened. They commonly do this even though they fully intend and desire to continue to receive their papers. Because of this tendency to delay renewals, the *Railway Maintenance Engineer,* in common with almost all other publishers, has continued to mail its issues to subscribers for sixty days after the expiration of their subscriptions to afford ample opportunity for renewal. Now, in view of the acute shortage of paper which is forcing some magazines to suspend publication entirely, it is necessary to adopt every practical means to conserve the supply for the most essential uses. As a step in this direction and in an effort to protect the interests of those who have paid their subscriptions, we will from this date discontinue all subscriptions on the date of their expiration. Since nearly all of our subscribers renew ultimately, we hope that they will heed this warning, watch the expiration on their wrappers and remit before their subscriptions expire. This is particularly important because present conditions also make it impossible to provide back numbers. In making this announcement the *Railway Maintenance Engineer* believes that it is acting in the interests of its subscribers. It does not desire to lose a single reader and it hopes that without exception they will heed this friendly warning and remit promptly.

Contest on Restoring Efficiency

As the maintenance of way forces are entering the season of most active work no officer or employee can avoid the fact that the complications confronting them in the completion of a normal year's work are increasing rapidly. In particular, it is becoming more evident that labor will be the controlling element and the season's output will be dependent directly on the number and character of the men available. Scarce as many classes of material are, the supply will in nearly all cases exceed that for which labor is available to use. This condition makes it essential that the work be so conducted that the greatest possible efficiency be secured from that labor which is available. The more general use of labor-saving equipment, more intensive supervision, improved facilities for the housing and feeding of men, the reorganization of the forces to restore the morale and overcome the effects of strike agitators and other disturbing influences, are some of the measures which may be introduced with profit. We believe that this is the most serious problem confronting the maintenance of way department at the present time and that it deserves the most thorough consideration and the freest interchange of ideas. For this reason we announce a contest on Means of Restoring the Efficiency

of the Mantenance of Way Department Forces, for which we invite discussions of this subject, with particular reference to steps which may be taken to increase the output of work or otherwise improve the performance of this department. Prizes of $25 and $15, respectively, will be paid for the best and second best papers presented, the award being based on the practicability and general application of the methods suggested. All other papers accepted and published will be paid for at our regular space rates. Contributions should be sent to the editor of the *Railway Maintenance Engineer*, Transportation building, Chicago, and must be received not later than May 20 to be considered by the judges. Any manuscript not used for publication will be returned to the writer.

AN OPPORTUNITY AND A TEST

THE NATIONAL ASSOCIATION of Railroad Tie Producers, which held its annual convention in Chicago on April 22 and 23, is now at the parting of the ways. Organized in January, 1919, at a time when its customers, the railroads, had concentrated their purchases in the hands of one organization, the United States Railroad Administration, its position was largely a defensive one. Now, with the roads back in the hands of their owners, the organization may become a strong constructive force for the betterment of conditions in the tie-producing industry or it may sink into oblivion. The ensuing year will decide which course will be pursued.

While involving the annual expenditure of millions of dollars, the cross-tie industry has in general been in an unsatisfactory condition from the standpoint of the producer and purchaser alike, a situation for which both must share responsibility. It has been characterized by bitter competition between producers, a condition which the roads have not failed to take advantage of in times of limited demand and purchase, and by marked reductions in quality of output when conditions were reversed. In short, two groups of individuals have contended with each other, with the advantage first on one side and then on the other. The result has been an absolute lack of standards or of uniformity of practices, for which all suffered. When ties were being produced in excess of the demand, as in times of declining traffic and reduced railway purchases, the producers were at the mercy of the purchasers, who applied the inspection as they saw fit, rejecting ties which under other conditions would be accepted readily. Likewise, in times of inadequate supply the producer has been able to force the waiving of vigorous inspection and has frequently secured higher grading than he was entitled to. The result has naturally been chaotic.

There is an urgent need for the stabilization of this industry. This can only be done by standardizing the product—the tie—by the general adoption of uniform specifications with sufficient classifications to meet the needs of all roads, and by maintaining these standards by uniform inspection under all conditions. Then a producer will know when he cuts a tie in exactly what class it will be placed and he will not be left to the mercy of an inspector from whose decision he has practically no appeal. Likewise, a road will receive equal protection and will know it is actually getting ties of the grade desired and paid for, regardless of the condition of the market.

Such results can only be secured through organized efforts. The railroads, through the American Railway Engineering Association and the American Railroad Association, already have machinery at their disposal to represent them. The most natural agency for the tie producers is the National Association of Railroad Tie Producers, an organization which already enrolls a considerable proportion of the tie production of the country among its membership. The extent to which this organization measures up to its opportunities will depend upon the degree with which the tie producers rally to its support and on the ability displayed by its officers in formulating a constructive policy. Railway men can afford to co-operate fully in all legitimate means to foster this movement.

RAILS ARE AT THE MERCY OF LOCOMOTIVES

IN THE EDITORIAL in last month's issue reviewing the work of the joint committee on Stresses in Track, brief reference was made to the portion of the report relating to the effects of locomotive speed, counterweight and other characteristics on the stresses in the rails. This question is of such vital importance that more detailed discussion of it is warranted at this time. All track men appreciate that the character of the engines and cars passing over the rails has a considerable influence on their life and the number of breakages experienced.

These impressions, however, have been more or less indefinite. There has been little of a tangible character from which the maintenance of way department could determine the extent of the burden which was being placed upon the tracks. The second progress report of the joint committee on Stresses in Track supplies some of this missing information, showing the intensity of the stresses which may result from excessive speed or even very ordinary speed under favorable (or shall we say unfavorable?) circumstances as to counterbalancing, arrangement of wheels, etc. This information is based on tests made on the tracks of the St. Louis-San Francisco and the Illinois Central, which were in ordinary good condition, according to the statement of the committee. Tests were made with Santa Fe and Pacific type locomotives on the Frisco and with Mikado type locomotives on the Illinois Central. The rail in each case was 85-lb. A. S. C. E. section.

The tests with the Santa Fe type locomotive showed that the maximum stress in the rail under the main driver at a speed of 50 miles per hour was 3.75 times that occurring in the rail at a speed of five miles per hour. Of this increase in stress, only 92 per cent was directly attributable to the speed. In other words, the stresses were increased 2.83 times as the direct consequence of the pounding action of the counterbalance. Tests made at speeds of 40 miles per hour showed an increase in stress of 2.58 times; at 25 miles per hour, an increase of 100 per cent.

Taking the average of all the tests on all the drivers, the average increase in stress for a speed of 50 miles per hour was 60 per cent for the Santa Fe type locomotives, 35 per cent for the Pacific type and 50 per cent for the Mikado type. These increases are for speed alone; for the influence due to counterbalancing at this speed the increase in stress was 85 per cent for the Santa Fe type, 30 per cent for the Pacific type and 60 per cent for the Mikado type locomotive.

Aside from the influence of counterbalancing, etc., on the stresses, some interesting facts were developed concerning the distribution of stresses in the rails. For instance, it was found that the stresses in two rails were not always the same, and that those in rails under the left side of the locomotive were as much as 20 per cent greater than on the right side. Another feature developed was the fact that the stress in the outer edge of the base of the rail was uniformly greater than that at the inner edge for all speeds, at all positions of the counterweight for all drivers, and for the higher as well as the lower stresses. The average of the stresses at the outer edge of several wheels ranged from 20 to 50

per cent greater than at the inner edge, or from 9 to 20 per cent greater than the *mean* in the base of the rail.

As pointed out in our previous reference to this subject, the studies of the Committee on Stresses in Track are by no means complete. However, sufficient data have been developed to prove conclusively that the stresses in the rails are frequently very heavy. Thus the *mean* stress in the base of a rail was to be as high as 52,000 lb. per sq. in. and 10 per cent higher than this in the head. When it is considered that a large part of this excessive stress is a result of the counter-balancing influence there is every reason to urge that more attention should be given in locomotive design to reduce these influences on the track to a minimum. It is not economical to attempt to reduce the stresses in the rail through increasing the section, and therefore the weight of the rail, until the locomotive designer has reduced his demands on the rail to the minimum.

GIVE THE MAINTENANCE FORCES A CHANCE

AS TRAFFIC HAS INCREASED, it has been the general experience of maintenance officers that their forces have been surrounded with more and more restrictions relative to interference with train movements, with the result that it has become increasingly difficult to do many classes of work on main tracks. The necessity for the avoidance of interference with trains has served to increase greatly the amount of unproductive time in those operations such as the relaying of rail where the track must be broken, has reduced the output of work and has increased its cost proportionately. It has also restricted the use of many types of labor-saving equipment which can be removed from the track only with difficulty if at all.

We do not contend that maintenance operations should or can be conducted without reference to traffic, but we do believe that they have suffered unduly and unwisely in some instances in the past. With the present acute shortage of labor, the limitations of the eight-hour day and the urgent necessity for the more general use of labor-saving equipment in order to even approximate the completion of the season's work, it is necessary to adopt every practical expedient to increase the output of work from the maintenance forces this year. It is self-evident that the interests of the railroad are best promoted when the net aggregate cost of its operations is lowest. If, therefore, the saving accruing to maintenance operations by delaying traffic to a certain extent exceeds the cost of this delay to the operating department, the net result is economical.

The maintenance department can secure the best results only by thorough co-operation with the operating department. Frequently a large amount of the interference of traffic with maintenance operations can be avoided by rearranging the schedules of freight trains so that they will pass the locations of most active work before or after the working hours of the track forces. The bunching of trains so as to concentrate the interference also helps. If maintenance officers will study their local problems with their transportation officers they will be able to effect marked improvements in many cases which will be reflected in greatly reduced unit costs and a proportionately larger output of work.

THE ORIGINAL SIN.—The seeds of trouble were sown when the Adamson law pistol was pointed at the public's head and the President and Congress weakly yielded, buying a temporary settlement at the expense of future security. Since the Adamson holdup there has been an increase of the highwayman spirit, as might have been expected.—The New York Tribune.

LETTERS TO THE EDITOR

INTEREST IN N. R. A. A. EXHIBIT

New York City

TO THE EDITOR:

I hope that you can find space in your columns for a word of appreciation concerning the interest shown by the railroad men in the recent exhibit of the National Railway Appliances Association at Chicago. Never before have I seen such intense, consistent and intelligent interest in the exhibits. I speak for myself and unofficially for others when I say that the way the roadway officers and track men went after new things and new ideas in this case means a lot in the way of improvement of track to decrease railroad operating expense.

It is my hope that the higher officers of the railroads will be informed of the increased interest on the part of their track people. I also hope the track people will be earnestly and cordially encouraged. I have attended conventions for many years, but never before have I seen such interest. AN EXHIBITOR.

INSTRUCTION IN PREPARING REPORTS

Fort Scott, Kan.

TO THE EDITOR:

One matter that requires attention at this time is the education of section foremen on the making of their various reports. The need of reports is recognized and their urgent need is appreciated, but there has never been a time when section foremen were so burdened with reports as they are at this time. It seems that no attention is paid to the number of reports that foremen are required to make and the consequences are that they are unduly burdened. If the matter was properly looked into, it is probable that some of the reports could be eliminated entirely and others could be consolidated or re-arranged so that two or more reports covering the same information, except on different forms, would not be necessary.

Of course, this might cause the clerical forces some extra work to get some of the information, but even if it is necessary to put on additional clerks it will be advisable, for it will give the foremen a chance to concentrate upon the track and its care, and they would not be working on the track with their minds on the preparation of reports on which they are not clear.

Everyone knows that a clear understanding on the preparation of reports cannot be had from merely reading a general letter of instruction. This indicates the need of regular monthly meetings of all section foremen on each division, at which the roadmaster and his clerk can go over each individual report and give the foremen a clear idea of what is wanted and how to prepare each report properly.

One of the greatest failings in the past has been to not keep the foremen informed as to what the report is used for after they prepare it. If this is explained to them they will see why it is necessary and they will have a better understanding how to assemble the information for its preparation. It has been the privilege of the writer to try these meetings out, and the percentage of correctly rendered reports has been increased fully 75 per cent, to say nothing of the satisfaction of the foreman that their reports are correct. The writer, for one, strongly hopes that the time is not far off when

the management will make it compulsory to hold these meetings and require every foreman to attend. When this is done, incorrectly prepared reports will be history and the reports furnished can be depended on to show reliable information. C. T. REEDER,
Roadmaster's Clerk, St. Louis-San Francisco.

THE TRACKMAN AND HIS WORK

Corry, Pa.

TO THE EDITOR:

Being familiar with the conditions surrounding the maintenance of way employee as a result of actual experience with the pick and shovel, I would like to offer a word about the track laborer and his work. A trackman's duties consist primarily of keeping the track in line and surface or as near to that as conditions will permit. A trackman cannot work according to a book of rules which tells him what to do every hour of the day, for if he should follow such orders it would not be long before there would be a wreck on his section. The track foreman must use judgment about his work and he must have the initiative and energy to carry out the work that his judgment dictates. He should be on the alert at all times to be sure that his men are in a safe position whenever there is a possible chance of an accident. He should keep a close check on inferior tools, removing them from service as soon as detected; in making repairs around yards he should use extra precaution that no material is left between the tracks where it might prove dangerous.

A man with as much responsibility as the trackman is certainly an important cog in the wheel of progress, for adequate transportation makes progress possible and the safety of transportation depends as much upon the trackman as upon any other class of employees.

FRED LUNDBERG,
Extra Gang Foreman, Pennsylvania Railroad.

THE PROPER WAY TO DRIVE EXPANSION

Dermott, Ark.

To the Editor:

In the August, 1919, issue of the *Railway Maintenance Engineer* there appeared an interesting and instructive article entitled "The Use and Abuse of the Track Chisel," by Howard C. Mull. In that article Mr. Mull said: "A good chisel should never be used for driving expansion in rails." He might better have said, "A chisel should *never* be used for driving expansion, for whenever a chisel is used for this purpose, the result is two badly damaged rail heads, and one has started a pounding joint." I think that a foreman should be severely disciplined if not dismissed for driving expansion with a chisel.

The proper manner for driving expansion is to loosen the bolts in the rails that are to be driven and free the rail anchors, or pull the slot spikes, as the case may be. Then a short rail should be taken—one that five or six men can handle—and the expansion driven by striking the ends of the angle bars in the direction in which the rail should be moved. To facilitate the driving, two angle bars may be placed, angle up, on the end of the ties, and the rail used for driving turned with the ball down. Four or five rails at a time can be driven in this manner, one blow of the rail closing the expansion in the joints ahead, and the next blow opening them. In cases where a large amount of expansion is being closed up in order to put in a longer rail, or piece of rail, it may be better to take out the bolts in one end of the angle bars in the joints being driven, as the rails can then be driven much faster.

Another question on which there is confusion is that of cutting rail. I think that most up-to-date trackmen now understand that it is not necessary to cut a rail half in two in order to break it. The best way to break a rail is to cut it lightly across the base and on each side of the ball (not on top of the rail), then a quick spring with the rail bender will snap the rail neatly in two. Where no rail bender is at hand, the rail can be notched lightly in the same manner as above described, after which four or five men should spring the end of the rail out, at the same time striking the chisel a blow or two in the notches already cut. The rail will then break easily without any necessity for removing it from the track. By breaking rails without cutting across the ball, a smooth rail end is obtained without the ridges ordinarily made by the chisel. J. A. MORRIS,
Roadmaster, Missouri Pacific.

NEW BOOKS

The Building Estimators' Reference Book, by Frank R. Walker, 2831 pages, four and one-half by six and one-half inches, bound in flexible leather. Published by the Frank R. Walker Company, 168 North Michigan Avenue, Chicago.

This book is essentially a reference book for the use of contractors and estimators engaged in estimating the cost of and in constructing all types of modern buildings. The first part of this book, which contains 20 chapters, is devoted to the making of the proper allowance for overhead expenses and general conditions. All phases of this are carefully worked out in a manner that makes them available for all classes of work. The remainder of the book treats with the subjects of excavation and back filling, concrete piles, foundations, floors, paving and other forms of reinforced concrete construction and the means of waterproofing such work; brick masonry, cut stone and rubble stone work, etc.; timber and general carpentry work; floor work and exterior finishes; sheet metal work, roofing and painting, etc., and special iron and steel work. The subjects of material and labor costs have been arranged throughout the book in such a form as to be adaptable to the varying local conditions encountered.

Proceedings, American Railway Bridge and Building Association, 1919, six inches by nine inches, bound in cloth or paper, 210 pages, illustrated. Published by the association, C. A. Lichty, Chicago & North Western, Chicago, secretary.

This volume contains a complete report of the twenty-ninth annual convention of this association which was held at the Hotel Statler, Cleveland, Ohio, October 21 to 23, 1919. As in previous years, the program covered the general scope of the duties of the master carpenter and his superiors. Thus in this issue there are reports on bridge inspection, repair and inspection of roofs, renewal of timber bridges, engines for pumping water, painting metal structures, pumping fuels and fire protection equipment. The first report, that of bridge inspection, takes up the variations in practices on the railways and contains a very comprehensive set of recommendations on organization, form of reports, personnel of inspection forces, etc. Two of the reports, namely, internal combustion versus steam engines for pumping water and the storage of fuel at pumping stations, contain a considerable amount of valuable information on this phase of water service. The last report, that on railway fire protection equipment, constitutes a set of recommended practices concerning fire extinguishers, fire hose, hydrants, water barrels, etc., for the protection of railway bridges and buildings in case of fire. A particular effort was made to summarize and apply such of the Underwriter's rules as are especially applicable to railway conditions.

RECENT DEVELOPMENTS IN WATER SUPPLY*

A resume of modern tendencies in equipment, treatment and economical operation of the stations

BY C. R. KNOWLES,
Superintendent Water Service, Illinois Central, Chicago

THE ESTIMATED annual consumption of water by the railroads of the United States is, in round numbers, 900,000,000,000 gal. The cost of furnishing this water, not including interest and depreciation charges, will average over 7 cents per thousand gallons, making a total annual expenditure of more than $63,000,000 for water. To supply this water it is necessary to maintain approximately 13,000 water stations for locomotive supply in addition to many connections for general service.

An analysis of the consumption of 15,622,000,000 gal. of water on a middle western railroad indicated that 23 per cent, or 3,600,000,000 gal., was purchased from 232 city and private water works plants and 12,022,000,000 gal. pumped by 230 railroad pumping plants. A further analysis of the various uses of this water indicated that locomotives consumed 74 per cent, or 11,560,280,000 gal.; washing and filling boilers at terminals used 12 per cent, or 1,874,640,000 gal.; 5½ per cent, or 859,210,000 gal., was required by stationary power plants, and 8½ per cent, or 1,327,870,000 gal. was used for sanitary and domestic purposes.

As an example of the increased consumption of water by railroads during the last quarter of a century a compilation of figures showing the water consumed at a railroad terminal in Central Illinois may be cited. The amount used at this point in 1898 was 72,637,000 gal., while in 1908 it had increased to 144,163,000 gal. and in 1918 to 288,454,000 gal. According to these figures the consumption doubled every ten years. It may be said in passing that the consumption in 1918 was 79,000,000 gal. less than that of 1914, because of a campaign against water waste. Except for this the amount used in 1918 would have been more than double that of 1908.

PUMPING EQUIPMENT

There has been a marked development in pumping equipment used in railway water stations within the past few years, not only in providing larger equipment to take care of the increased requirements for water, but in the type of pumping equipment and power units as well, the old steam plant, long considered most satisfactory because of its adaptability to the varying conditions found in railway water service and its ease of operation with unskilled labor, giving way to more modern equipment. The gasoline engine was a popular power unit for railway pumping stations as well as in the general industrial field for a time, but it was really never a serious competitor of steam except at the smaller stations and points where the cost of pumping with coal was excessive.

Electricity has become available in many communities at rates sufficiently attractive to warrant serious consideration, with the result that there has been considerable use of electric motor drive for pumping plants at water stations. Two factors have been responsible for this development. One is the increased number of points where electric power is available; the other is the economies which may be effected by the substitution of electric motors for steam and gasoline engines, especially when the motors can be operated by automatic control, thereby eliminating all of the expense for constant attendance.

The motor-driven pumping plant with float switch control is especially suited to locomotive water tank service because the tank is kept full, regardless of variations in the demand for water, without any attention other than a periodical inspection of motor, control and pump. It is also practical in some installations to have the station agent or other local employee start and stop the pump motor by means of a remote control push button. This standard equipment now on the market is reliable and can be depended upon for pumping station service.

One middle western railroad has recently installed electric pumping equipment consisting of duplicate units, each having a capacity of 1,000,000 gal. per day, the operation of pumps being entirely controlled by the height of the water in the tanks. The former steam plant required three men, while the electric plant is op-

*A paper presented before the Western Society of Engineers, Chicago, on April 29.

erated by one. While the cost for current is about equal to the cost of coal formerly used in the operation of the steam plant, the net saving is $1,500 per year.

Oil engines of the so-called semi-Diesel type are being used extensively in railway water service and are proving very economical and satisfactory power units. Oil engines operating on the lower grades of oil have been perfected to such an extent that their operation is practically as reliable as steam, although they are not as flexible when used with triplex and other positive displacement pumps. Failure to consider this feature has resulted in a few unsatisfactory installations. Oil engines have gained in favor as the centrifugal pump has been developed, as an oil engine and centrifugal pump make an ideal pumping unit. As an example of the increased use of oil engines, one of the largest manufacturers of this type of power unit in the United States sold 496 oil engines to railroads in the five years ending January 1, 1919. These engines represent a total of 9,827 horsepower, 451 of them being 25 horsepower and under. Of this equipment the total horsepower sold in 1918 was 4,125, or 42 per cent of the total business of the previous four years, an increase over the average for the four years of about 290 per cent. As an example of what may be accomplished by installing an oil engine, a plant consisting of two 25-hp. engines driving centrifugal pumps with an additional 100,000 gal. storage has dispensed with the pumpers at an annual saving of $1,800 in labor alone, besides a considerable reduction in the cost of fuel.

The use of oil engines and electricity has encouraged the further development of centrifugal and power pumps for use in connection with these power units and has resulted in a decided improvement in the efficiency of these pumps, which is especially true of the centrifugal pump. The cost for fuel will, of course, vary in different localities, but there is scarcely any place in the country where oil will not compare favorably with coal in operating a pumping plant. The economy of an electrical installation will, of course, depend upon the rate paid for electricity and the economies to be effected by decreased attendance.

An interesting feature in connection with recent water station construction is the growing tendency to install duplicate pumping plants. While this, of course, increases the cost of construction, it is not difficult to justify the additional expenditure by uninterrupted service and reduced maintenance.

STORAGE

Storage is an important feature of railway water service, but unfortunately it is a detail that has been much neglected in the past. Up to within the past few years the standard roadside tanks rarely exceeded 50,000 to 60,000 gal., although the standard roadside tanks today include those with a capacity of from 100,000 to 200,000 gal.

The necessity for greater storage is more evident at this time than ever before, with shorter hours of service and the increased wages of pumpers. The purpose of a water tank is to provide storage for a volume of water that will be ample for all requirements at a head sufficient to deliver the water in adequate quantity at the points required. The size and capacity of the tank and the height of the tower will be governed entirely by these two requirements. For example, if the delivery to the tank is constant, as from a city supply, and the demand fairly uniform, the size of the tank may be nominal, but if the delivery or demand is irregular the capacity of the tank should be great enough to carry over the period when water is not being delivered to it and to take care of the maximum consumption.

The amount of storage available is an important factor in the operation of a railway pumping station, as the expense for operation can be doubled easily through the necessity for employment of additional pumpers by reason of the tank being too small to carry over the night hours, notwithstanding the fact that the equipment may be large enough to pump all of the water required during the day shift.

Tanks now in use and adapted for use in railway water service comprise practically every type of tank constructed. Most of the tanks of the past have been constructed of timber, and, while other materials are being used, there is no question but that timber will continue to enter into the construction of tanks to a large extent. The comparative life and value of wood and steel tanks have been the subject of much discussion, each type of tank having its more or less disinterested champions. Unfortunately, much of the discussion has consisted of individual opinion or the citing of an obscure example of what might be expected of each type of tank. With the increased scarcity of suitable timber for the construction of wooden tanks steel has become a very serious competitor, particularly in the standard tanks of 100,000 gal. capacity. Previous to the great increase in cost of steel and the restrictions placed on the railroads, prohibiting the use of steel for water tanks during the war, steel tanks were largely supplanting wood tanks. Conditions growing out of the war, however, have compelled the railroads to again consider the wooden tank.

One important development along this line has been the use of treated timber for the construction of tanks. On certain railroads favorably situated the creosoted tank has proved a very profitable investment, as the first cost of construction has been much less than either an untreated tank of more permanent timber or the steel tank. While these tanks of treated timber have not been in service long enough to determine their useful life, there is every reason to believe that their life will be as great as that of the best untreated timber and the maintenance of a treated tank properly framed before treatment much less than either the untreated timber tank or the steel tank.

One decided advantage possessed by the modern conical bottom or hemispherical steel tank over the wooden tank or flat bottom steel tank is the removal of suspended matter carried by the water, through precipitation. There is a great need for a simple type of settling basin or filter for use in connection with the wood tank, as the removal of the suspended matter from water supplied from streams before it enters the locomotives will effect material economies in boiler repairs and washouts.

WATER TREATMENT

There has probably never been a time when more interest has been displayed in the treatment of locomotive water supplies than within the past two or three years, the reason for the increased interest in water treatment being, of course, due to the greatly increased cost of fuel and boiler repairs and the importance of keeping locomotives in service. It is only too true that the treatment of locomotive boiler supplies has been neglected, as may readily be seen by comparing the amount of water treated with that requiring treatment. While there is no complete record of the number of water treating plants in service on the railroads of the country, a fairly accurate estimate would be in the neighborhood of 600 plants, and from the known capacity of some 200 plants the average amount treated by each plant is 36,000,000 gal. per year, or approximately 21,600,000,000 gal. of treated water is used annually on railroads.

Assuming that 80 per cent of the total consumption,

or 720,000,000,000 gal. of water, is used by locomotives and power plants and that 50 per cent is of such quality that treatment would be economical, it means that we have less than 6 per cent of the treating plants in service that are needed. It is only necessary to check the reports of the results obtained from treating plants on those roads having them in service to be convinced that there are few investments that can be made on a railroad that will show quicker or greater returns than a properly designed and operated water softening plant.

The report of the results obtained on the Missouri Pacific for 1918 show that 1,368,305,000 gal. of water were treated, removing from this water 3,589,473 lb. of scale-forming matter, effecting a net saving of $279,843, these results being accomplished through 52 water treating plants, the majority of which are in the hard water district in the plains west of Kansas City. Another instance is the excellent results obtained from the treatment of water on the Great Northern, which road has in service 77 plants, where the saving in fuel, boiler repairs and engine time have fully justified the expenditure for construction and operation of these plants.

Still another example of what may be accomplished by properly treating water is given in a report on the results obtained with a plant treating water for equipment used on railroad construction, the water being used in the boilers of two steam shovels, six locomotives and two hoisting engines. In this particular instance the results are conclusive because the equipment was limited to a supply of water from a single source, the final results being based upon the results obtained from the use of the water before and after treatment. Briefly, the saving of the entire cost of the water softening plant was accomplished in less than two months. The cost of coal used per cubic yard of earth handled was $0.0306 with the untreated water and $0.0204 with the treated water, a reduction of 33 per cent.

The United States Fuel Administration stated in its Engineering Bulletin No. 3 that it has been estimated that the use of hard water in a great number of the locomotive boilers of the country involved the consumption of 15,000,000 tons of coal more than would be needed if soft water only was used.

There is no lack of data on the benefits to be derived from the treatment of the water, nor apparently is there a lack of appreciation of the importance of water treatment. The fact that a larger percentage of the water conditions are not improved is evidently due to the fact that there is not a centralized responsibility for the quality of the water.

WATER WASTE

The Illinois Central has been making a campaign against water waste for the past five years, with the result that the saving during this period has amounted to $326,900, an average annual saving of $65,380, or nearly $200 per day. This saving has been accomplished by investigating every possible source of waste and keeping the importance of the subject constantly before officer and employee. The principal saving was made in the cost of city water and efforts were directed chiefly toward correcting the waste of water purchased from outside parties, as the cost of water purchased is generally higher than that pumped by company forces, although large reductions were made in the consumption of company water as well as city water.

In order to keep a check upon the water purchased, all bills are entered on a card index for the purpose of comparing cost and consumption. Any increased consumption is noted and called to the attention of the officer having jurisdiction over the water at that particular point. If a satisfactory explanation cannot be given an investigation is made, which invariably results in disclosing and correcting the waste.

While many instances of conditions found and corrected in these water waste surveys might be recounted, it is sufficient to say that there are few water services on the average railroad where a saving cannot be made in water. While large wastes, such as overflowing tenders and tanks, bursted mains, etc., are important, as a general thing they do not require much attention to correct, as the loss is very apparent. It is usually the smaller leaks, such as at slop sinks, wash basins, toilets, urinals and other fixtures connected direct to sewers and drains, that cause the greatest waste and are the most difficult to correct because of the apparent insignificance of the loss and hidden nature of the waste.

As an example of the quantity of water that may be wasted through small openings, a $\frac{1}{16}$-in. stream such as may be caused by a worn faucet washer will, at 40 lb. pressure, waste 18,844 gal. per month, which at 20 cents per 1,000 gal. will amount to $3.68, or enough to purchase a new faucet, while a ¼-in. stream, such as an overflowing toilet flush, will waste 301,500 gal. per month, at a cost of $60.30, or enough to install a first-class toilet complete.

It is not surprising that water waste occurs on our railroads when one considers that the daily consumption is nearly two and one-half billion gallons, delivered through innumerable connections and under the control of thousands of employees, the greatest number of whom have no conception of the value of water. The fact that waste does occur is generally accepted, but it is a mistake to assume that the waste cannot be corrected or that correcting an occasional waste here and there solves the problem, as it is only by continued effort that maximum results are to be obtained.

ORGANIZATION

There has been a marked change in the general attitude towards railroad water service in recent years. Water supply was formerly merely an incident in railway operation, any supply most convenient was used and little consideration was given to the quality or the cost of producing the water. As the importance of this branch of railway operation was recognized and the need for more and better water increased with the development of transportation, the various features pertaining to water supply have been given more attention. This increased interest has been directed to some extent towards providing an organization for properly handling the various problems concerned in the development, construction, operation and maintenance of water supply.

The general idea prevailing as to a water service organization is usually associated with the construction of water facilities rather than with the maintenance and operation. While the development of water supplies and the proper design and construction of water facilities demands careful study, operation and maintenance are of equal importance, and continued trained supervision is necessary if economical results are to be obtained.

Providing water for locomotives and other railway purposes is a feature of railway operation that varies more widely than any other department. While several railroads have recently established water departments, others still retain the old organization whereby the development, design and construction is handled by someone in the engineering department in connection with other duties and the maintenance and operation of water stations is handled by the supervisor or foreman of bridges and buildings as a part of his duties. The development of an adequate water supply, the economical and efficient design and construction of water stations,

together with efficient supervision over maintenance and operation, are problems that require the undivided attention of a staff trained in water service work. The problems connected with water supply can best be solved with a separate organization charged with the sole responsibility for their successful operation. On most railroads the nucleus of a water department organization exists and the establishing of an individual department would not necessarily mean that there would be any material change in the division or local forces, but rather that the local officers and the engineering department would be relieved of the duties incident to the design, development and operation of water facilities and the work placed under the direction of those trained along this particular line. The results obtained by roads that have established a water department have shown conclusively that there is an urgent necessity for an organization to handle this very important feature of railroad operation.

THE MAINTENANCE OF WAY BROTHERHOOD IN TROUBLE

AFTER A SOMEWHAT meteoric career during the first nine months of its existence, the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers is now experiencing its first serious setback. Allen E. Barker, grand president, and George Seal, grand secretary, have both resigned and their places have been filled by E. F. Grable as grand president and Samuel J. Pegg as grand secretary-treasurer.

The organization has also been deprived of its charter under the American Federation of Labor, it having developed in the course of the present difficulty that the American Federation suspended the charter temporarily on December 31, 1919. Another difficulty has been the formation of a new organization, the American Brotherhood of Maintenance of Way Employees, with headquarters in St. Louis, Mo. This body consists essentially of the former members of the American Brotherhood of Railway Trackmen, which was organized at Bonne Terre, Mo., in March, 1916, and affiliated with the United Brotherhood last summer.

Ex-President Barker figured prominently in the strike order of the United Brotherhood during the last few days of the federal control period and was also the prime mover in the purchase of a number of clothing factories and knitting mills by the brotherhood about the first of the year in an effort to cut down the cost of clothing for the brotherhood members. His resignation followed complaints of extravagance and irregularity in the handling of brotherhood funds.

The position of the United Brotherhood with respect to the American Federation of Labor is given in a statement by President Grable as follows:

"Owing to jurisdiction disputes which have arisen and are not yet settled to the satisfaction of all concerned our charter has been temporarily suspended by the American Federation of Labor. However, this does not mean that our charter has been revoked, and we do not believe that it will be. In fact, we shall send delegates to the convention of the American Federation of Labor at Montreal next June when these questions will be settled to our satisfaction. We may add for your information that we are a standard organization recognized by all the other fifteen railway International Unions, and at no time during our suspension would the A. F. of L. think of granting a charter to any body of men representing the class of workers covered by our United Brotherhood."

The occasion for the formation of a new maintenance of way brotherhood is explained in a statement by Robert H. Eaves, grand president of the new organization, which is quoted as follows:

"Our former organization, the American Brotherhood of Railway Trackmen, was founded and organized at Bonne Terre, Mo., March, 1916, and grew to a membership of 27,000 members up until July, 1919, when it was amalgamated with the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers of Detroit, Mich.

"This amalgamation was effected by a majority vote of the members of the American Brotherhood of Railway Trackmen in order that the men of our craft might have the support of the American Federation of Labor, but owing to the fact that the United Brotherhood has now been suspended from the A. F. of L., and our former members are demanding an organization affiliated with the A. F. of L., a resolution has been adopted whereby we are reorganizing and applying to the A. F. of L. for a charter."

RAILWAY DEVELOPMENTS IN MEXICO

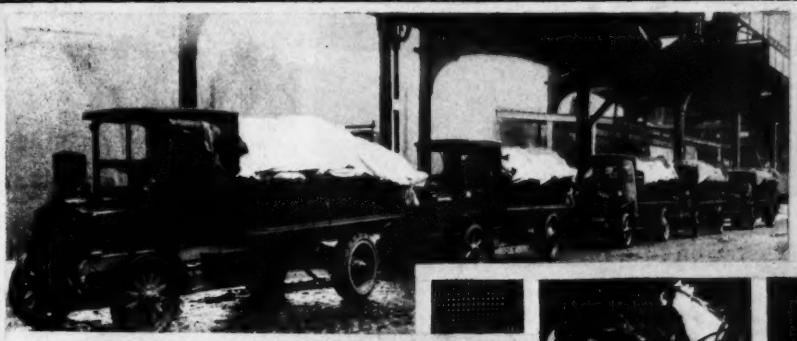
IN SPITE of the obstacles arising from unsettled political conditions, the Mexican government has made no little progress in the restoration of railway facilities in that country. Until the recent uprising trains were being operated on all but about 20 miles of line located in the states of Morelos and Guerrero, although military escort was still found necessary in certain sections. How seriously the present disturbance is interfering with current program for railway improvements is now impossible to determine. The following is a review of construction and reconstruction progress to date.

About 5,000 temporary bridges, culverts, etc., on the system are to be built or reconstructed permanently and the government is taking steps to replace these with concrete structures. Two large tie and timber treating plants are being installed. One is located in Aguas Calientes, and the other in Perote, Vera Cruz. It is possible that even with these plants it may become necessary to order a large amount of creosoted timber from the United States.

The new lines now under construction include: (1) An extension from Durango, Durango to Mazatlan, Sinaloa, on the Pacific coast, about 180 miles of single track, and involves 80 tunnels, the longest of which will be approximately 1,300 ft. This line will cost about $21,000,000 (Mex.). (2) An extension from San Marcos, Jalisco, on the National Railways of Mexico to Tepic on the Southern Pacific, which runs along the Pacific coast of Mexico. This line comprises about 72 miles of road, and when complete will cost approximately $8,000,000 (Mex.). (3) Other lines of less importance are also in the process of construction, as, for instance, the line from Saltillo, Coahuila, to the east, and a line from Cuatro Cienegas, Coahuila, to Sierra Mojada, which will join the old International Railway to the North Mexican Railway. According to latest information about $450,000 in gold was being spent per month in connection with construction work.

Track facilities and passenger stations at Tampico, Torreon and Guadalajara are now under construction. New passenger stations at Durango and Saltillo will be finished shortly, as will the shops and roundhouse at Saltillo. These shops are designed for heavy repair work and will take care of approximately 24 engines of about 120 tons. The car shop will have a capacity of about 200 cars, and the necessary machinery, tools, etc., for these shops are estimated to cost $2,000,000 (Mex.).

Railroading Here and There



STRIKES AND STORMS MAKE OPERATION DIFFICULT DURING PAST MONTH

Motor Trucks Haul Meat from Chicago to Near-by Cities
Photo Courtesy Chicago Daily News

First Session of New Railroad Board. Standing—G. W. Hanger, Albert Phillips. Seated—W. L. Park, J. H. Elliott, Henry F. Hunt, Horace Baker and James J. Forrester.
Photo Copyright by International Film Co.

New York Ferry Boat Under Double Service During Strike
Photo Copyright by Underwood & Underwood, N. Y.

Blizzard Blocks Chicago Terminals on Easter Sunday
Photo Copyright by Underwood & Underwood, N. Y.

Office Employees Replace Striking Switchmen
Photo Courtesy Chicago Tribune

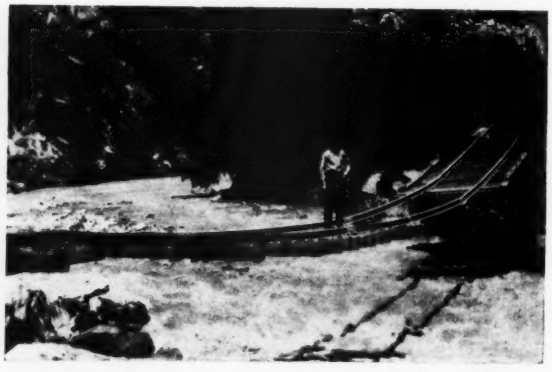
Unloading Milk from Cars Under Police Guard, Chicago
Photo Courtesy Chicago Tribune

Freight Piled Up at West Shore Station Awaiting Shipment
Photo Copyright by Underwood & Underwood, N. Y.

Parcel Post Congestion in Chicago
Photo Copyright by International Film Co.

IT WAS NOBODY'S BUSINESS

BY CHARLES H. SMITH



IN THE EARLY DAYS, when the C. G. R. & W. R. R. was constructed, modern machinery to which railroad builders now have recourse was unknown. Moreover, the resources of the company were limited, and consequently locating engineers were compelled to lay out a line which avoided extensive work in the making of cuts and fills so far as was possible. This explains the many curves, grades and what now seems the excessive mileage of the road. Of course between the time of building the road and the present many improvements have been made, and it now bears little resemblance to the road of forty-some years ago which went winding through the forests of pine, oak and hemlock with very little ballast, light rail and few sidings. But the original grades and curves of the road are practically the same as when the first locomotive chugged its rough way over them.

As on all railroads the lines to receive the most attention are the lines which bear the greatest amount of traffic, so on the C. G. R. & W. those portions of its track which connected the larger cities and lake ports were maintained the best while some of the branches with less traffic were allowed to lag behind in the matter of maintenance and operation.

In particular was this true of the Adlake branch running from Emerson, where it tapped the main line, to Adlake, 52 miles northwest of Emerson. The country which this branch traverses is for most part sandy, not a very rich agricultural region, which partly explains the minor importance of the line. Today the Adlake branch is in first-class condition for a branch line, but when William Loomis took charge of it as supervisor of track it was hardly worthy of being called a railroad. That, of course, was a long time ago when good foremen were not plentiful. Loomis had been at his wit's end to find competent men to take charge of the sections. The branch had been bad enough when it was first built, which, perhaps, was to have been expected. But it went from bad to worse until one day word reached Loomis through a private interview with his chief that something had to be done immediately to improve the Adlake branch.

The first thing that Loomis did was to rid himself of five incompetents among the ten foremen on the branch. This, in spite of the fact that he did not have an idea where he could find men to replace them. But he did replace them and one of the men he found was John Wilson. Loomis heard of Wilson through one of his foremen on the main line and immediately wrote to him offering him Section Ad-5 with headquarters at Lake Pleasant. Wilson replied that he would be up to look the section over and would advise Loomis whether he wanted it or not. It did not take long for Wilson to decide. A ride over the thinly ballasted, rough and run-down track was enough to dishearten any conscientious foreman who took any pride in the appearance of his section. That afternoon he rode into Emerson and reported at the supervisor's office.

"Well, what do you think of it?" asked Loomis.

"It's in awful shape, Mr. Loomis. I don't care to take it," replied Wilson.

"I know that it's in bad condition, Wilson," said Loomis, "and that's why I want you to take it. You've been recommended to me as a good man to put that section in shape. If you'll take it I'll help you all I can to get it up to standard and then it won't be hard work to keep it there. You can have all the gravel you want on it, and, of course, an extra gang to help get it in condition. I'll put on a work train and ballast the entire section. Once it is in shape it will be as good a section as you can get anywhere. Lake Pleasant, your headquarters, is a fine little town, a very good place to live. And, as I said, I'll help you out all that I can."

For a moment Wilson wavered before he decided. Then he replied: "All right, Mr. Loomis, I'll take it."

John Wilson proved to be a good foreman, and Loomis did all that he promised to do and soon Section Ad-5 began to look like a real railroad. That summer the work trains spread a heavy layer of gravel over the entire roadbed of the Adlake branch and in due time Wilson had the ballast under the track. He gave special attention to lining and surfacing, with the result that the track soon began to bear some resemblance to main-line. After a while when he could spare the time he dressed up his track well, and finally mowed the right of way. All of this took time, but he kept at it steadily during the year, accomplishing as much as was possible. The second year saw further improvements, but not until the end of the third year was John satisfied with his efforts. At the end of this period his section was acknowledged to be the best on the branch. From being literally a "streak of rust" the Adlake branch had been improved until it was the best branch on the system, so far as condition of track was concerned.

Much credit must be given Wilson for the showing made on the Adlake branch. When he was hired he was undoubtedly the best foreman on the branch, and the influence of his work extended in some degree from one end of the branch to the other. It is quite easy to understand this when one knows trackmen. Drop a good foreman among a number of mediocre foremen on a sub-division and what happens? The two foremen having charge of the sections adjoining his on either end observe his work and the high standard to which he keeps his track. Immediately they strive to make their track as good as that of their brother-foreman's. A foreman never feels more uneasy than when he realizes that the track adjoining his is in much better condition than his own track. Because of this rivalry a good foreman can have a decidedly beneficial influence on the track for some distance from both ends of his section.

Supervisor Loomis was not unaware of this fact. He realized that he owed much to Wilson. Probably if he had been asked to name his best foreman in those pioneer days he would unhesitatingly have said: "John Wilson." Furthermore no one would have agreed with him

more heartily than the men who worked under Foreman Wilson. Wilson knew how to handle men. He insisted that their work be done well and thoroughly, and that the track be kept up to his ideas of what it ought to be. He, himself, was a conscientious worker. Yet so wisely did he direct their efforts that every move counted and they never considered themselves overworked. The full co-operation of his men was one of the things that made it possible for Wilson to have the best-maintained section on the branch.

There was, however, one serious fault to be found with Foreman Wilson, which revealed itself more and more plainly as the years passed by. He had learned all that he knew about railroading from actual experience, and he had little patience with those who tried to expound theories. This caused him to be particularly intolerant of printed circulars, general instructions and bulletins which were issued from time to time. Letters from the supervisor were given respectful attention, but mimeographed or printed matter addressed to all foremen was rarely read. Usually the bluff foreman impatiently crumpled such "light literature," as he called it, into a wad and threw it from him disdainfully. "Written by some clerk that don't know the difference between a pick and a spike maul," he would say contemptuously. "If those fellers want to tell me something about track work let 'em come out here on the track and show me."

Another tendency which grew more marked as he advanced in age was his distrust of new things. The rapid strides which maintenance work made seemed difficult for Wilson to keep up with. Either he could not or would not make use of the latest devices and methods until he was literally forced to do so by Loomis. But handicapped as he was by his antiquated ideas John somehow managed to keep his track up as well as that of the average section. However, because of his old-fashioned notions he could no longer be judged to be the best foreman on the Adlake branch. Loomis thought that it was his age beginning to tell on him and was lenient with "Old Jack," as he was beginning to be called.

Pursuing such a policy, it was only a question of time before Wilson was going to get in trouble with his superior officers. The various circulars, general instructions and bulletins may have been prepared for distribution by clerks and printers, but certainly they were not written by clerks and printers. They were written by practical, hard-headed men who had for most part risen from the ranks; the men under whom John Wilson worked. That they were necessary soon became evident. Time after time Old John had his attention called to something that he had failed to do or to something that he had done wrongly because he had failed to heed the advice sent him on the printed sheets. Loomis, who felt that he owed much to the old man, tried to be as patient with him as he could. He gave him many friendly warnings, tried to reason with him and point out his mistakes. The supervisor was still willing to help him all he could.

But Old John was not to be helped. The whole trouble was in his attitude, and that he refused to change. He felt so sure, so confident that he was doing everything right in serving and safe-guarding the company's interests that he brushed aside the well-meaning advice and counsel. He could take care of the track better than "those clerks," he said. And so things went from bad to worse. From being the best foreman between Emerson and Adlake, Wilson dropped down in the scale until other foremen began to wonder "how much longer the company will keep Old Jack." But Supervisor Loomis who had a real liking for the old foreman continued patient and helpful as ever.

The climax was reached one day when the local freight train pulled into the Lake Pleasant siding after doing the station work. Here they waited until Extra 158 West passed them and then started to pull out on the main line. As the last three cars and the caboose passed over the derail—which Old John had disconnected from the pipe on account of it being out of order—it hopped back upon the rail under the train and ditched the entire rear end of it. Supervisor Loomis who had stood by Wilson for so long, who had tried to warn and advise him, knew then that he could no longer retain the old foreman in the service. He had overlooked many things, had excused errors of omission and commission because of Wilson's good record in the early days of the road, but this was something which he could not pass over. The case was very clearly against Old John and was due entirely to his prejudice against theoretical railroading. After the derailment was cleaned up Loomis drew the old man to one side.

"John," he said, "I'm sorry to say what I am compelled to say to you. You've been with me for a long while and have done a very great deal to bring this section up to what it is. I want you to know that I appreciate your work. But for some time past you've allowed yourself to slip. You've been very slow to adopt anything new in maintenance work; you've stuck to the old methods too much. Not that the general character of your work isn't good. It is. But you could have accomplished the same results much easier had you been willing to have kept up-to-date on track work. And again, you've been very reluctant to observe the instructions which have been sent to all foremen from time to time. John, that's exactly what put that train in the ditch—your failure to heed one of those circulars. Circular No. 127 was sent to all foremen less than two weeks ago and in it we warned you that, if you were compelled to disconnect the pipe from a derail, the derail must be wired down. From experience we had learned that when the pipe is disconnected from the derail close to the derail it is quite likely to jump back upon the rail when a train passes over it. Especially is this likely to happen if the rail is light as it is on your siding and the loads passing over it are heavy loads. The vibration of the rail causes the derail to jump back upon the rail. We wanted all foremen to benefit from that experience, but evidently you have failed to do so. I presume you received that circular all right, didn't you?"

"Yes, I suppose that I did, Mr. Loomis." Old John had not read anything printed or mimeographed for some time and he did not know whether he had received it or not.

"But you didn't read it," guessed the supervisor.

"No, sir, I didn't," admitted Old John.

"I'm sorry, John, very sorry, but I'll have to let you go. After what has happened to-day I would not feel as if I were doing my duty if I kept you in the service. I hope that you can understand my position in this matter," he added kindly.

For a moment Old John was stunned. The impossible had happened.

"I think I understand, Mr. Loomis," he replied falteringly at last.

And so a few days later young Leo Slovenski took charge of the section that had been held for so many years by the veteran foreman. Old John in the days that followed had but little to say to anyone. Too late he realized that the scorned circulars had cost him his posi-

tion; too late he understood. Until Loomis had mentioned it to him he had not comprehended that many of the circulars were simply records of lessons drawn from experience. He did not blame Loomis. He blamed the person at fault, himself.

It is difficult for a man to give up the work abruptly to which he has devoted himself for over twenty-three years. Especially is this true when the man feels that he is capable of giving many more years of service. Quite frequently Old John might have been seen walking over the section which he once supervised. Always he avoided coming in contact with his old gang. Sometimes he would meet the foremen on the adjoining sections and at such times he would inquire about track conditions and the news of the road. Although he did not ask about the new foreman he learned that while his fellow-workers respected Slovenski's ability as a foreman they did not like him personally. The ideas which he expounded were not only impractical but radical as well. He was more interested in strange doctrines than anything else. Quite frequently the old foreman would watch the trackmen as they worked at different jobs on the section. Once he expressed his approval of a new type of jack after he had carefully examined it.

One day early in May he went to the station to take the train for Emerson. To escape an approaching storm he had started early and upon arriving seated himself in the waiting-room. The train was marked up 30 min. late. Shortly after he arrived the threatening rumbles of thunder which had for some time been presaging the storm grew louder and more threatening and then suddenly it began to rain. Slovenski and his men who were working not far from the station quickly grabbed their coats and ran into the waiting-room for shelter. The rain came down in sheets; it literally poured down. Within a few minutes the ground was covered with water. It seemed unable to run away as fast as it was coming down. In the little waiting-room the section men watched the storm through the swimming panes of the windows. For nearly an hour the rain came down with tropical fury before it slackened its force slightly.

John Wilson looked over towards Slovenski expectantly as the storm began to abate. The new foreman was indolently rolling a fresh cigarette. This completed, he lighted it and slouched down to a comfortable position in his seat. Plainly he was at ease with the world. For a moment the old foreman hesitated and then he walked over to Slovenski.

"Aren't you going to patrol your track after this rain?" he asked.

Slovenski looked up at him a minute before he deigned to answer. Then removing his cigarette from his mouth he blew a cloud of blue tobacco smoke toward the ceiling. "No," he replied shortly.

"I—I used to be foreman here," explained Old John, "and I know the roadbed pretty well on your section. The soil is so sandy at several points that it needs close watching after a storm like this. I'd advise you to take your men and go over the track ahead of No. 2. It may not be safe for them to run over."

Slovenski continued to puff on his cigarette languidly. Apparently he had not even heard.

"Aren't you going to go?" asked the old foreman at last.

"No."

"Why—why not?"

"It's not my business to get out when it's raining, if you must know."

"Whose business is it then?"

"Nobody's business."

For a minute Old John looked at Slovenski in wonder. Then turning he left the waiting-room and started down the track, walking rapidly. The old impulse which he had obeyed for so long caused him instinctively to do the thing that needed doing. Hurrying along as fast as he could he watched the track as he went. No. 2 would follow him in a few minutes unless it was still later and he wanted to know that the track ahead of it was safe before the train went over it. A mile down the track was a bad spot. Coming to it he hesitated only long enough to make sure that it was all right for traffic and then he hurried on.

A quarter mile farther was a fill about 150 ft. in length. On the south side of the fill the valley sloped downwards to a little creek while on the north side it enclosed a small basin. Because of the character of the soil, the small drainage area, no facilities for draining the basin had been made. In fact, none seemed to be needed. For over forty years there had been none and nothing had occurred to cause anyone to think that it needed an outlet. Sometimes when it rained hard a quantity of water gathered in the basin, forming a small pond. Perhaps a little seeped through the banks of the fill. But in a few days or a week at most it had all soaked away into the sandy soil or evaporated. Although Old John had suggested the planting of a culvert pipe under the track Loomis had never given more than a passing glance at the place when on inspection trips and nothing had been done.

But proof that something ought to have been done was not lacking that morning. When Old John came in sight of the place where the fill was he stopped a minute and rubbed his eyes. The fill, nearly 150 ft. long and 8 ft. deep, was gone. Fully 5 ft. from the ground over the place where it had been the sagging pair of rails was suspended with the ties sticking to them. The old foreman ran back down the track and a few minutes later the engineer on No. 2 dimly saw him through the rain-spattered window of his cab violently giving the stop signal with the aid of his hat.

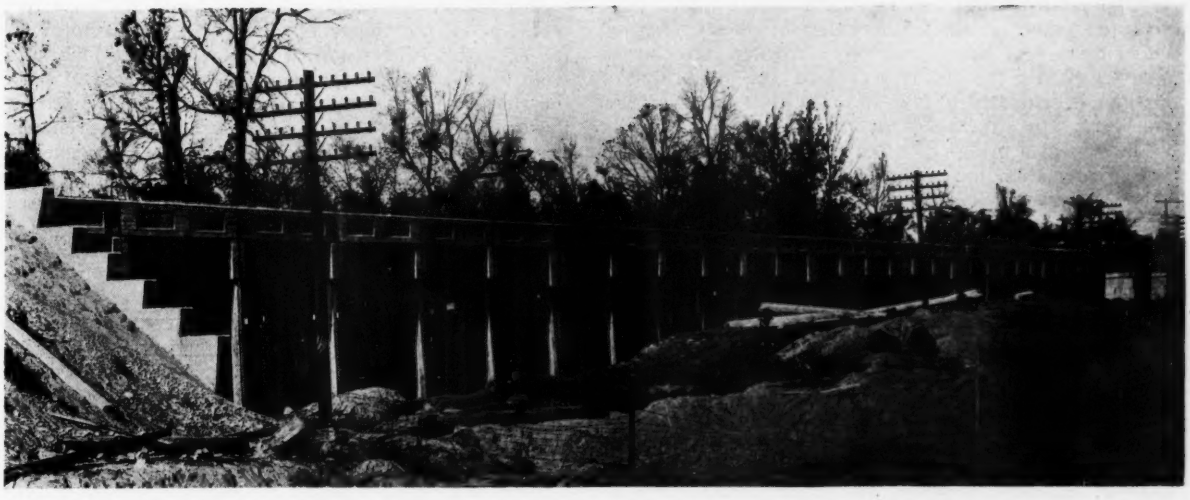
* * * * * * *

The second day after the washout Supervisor Loomis sought out Old John in his modest little home in Lake Pleasant. His face wore a kindly smile, for he liked the errand he was doing.

"John," he began after shaking hands with the old foreman, "I've heard—never mind now—but I've heard all about your part in the affair at the washout, and I want to thank you for what you did. The biggest fault with the company's employees—nearly all of them, John—is that they refuse to do anything outside of their prescribed duties. And yet you, an employee dismissed from the service, saw fit to attend to what Slovenski called 'nobody's business' . . . John," continued the supervisor with a kindly twinkle in his eye, "do you suppose that you could stand reading our 'light literature' and risk adopting some of our new-fangled ideas regarding track work? Because if you can I want you to assume charge of your old section to-morrow morning."

And John with a new understanding written in his eyes replied happily: "I'll be there, Mr. Loomis."

SLIDES AGAIN CAUSE TROUBLE AT PANAMA.—The Panama Canal has again been the scene of slides in the Culebra cut, which were of sufficient volume to hold up canal traffic for a short time. Dredges are being kept in attendance and are excavating continually to keep the canal open. The situation is not considered as particularly serious, although it is expected that the slides will continue in some measure for considerable period.



Do Present Prices Affect Renewal Plans?

Several Bridge Engineers Discuss Different Phases of This Important Problem—Various Points of View

THE PRICES of structural materials are at present very much above what they were before the war period and even considerably above those of a year ago. In consequence, relationships between the costs of various types of railway structures, as they were generally accepted during normal times of the past, have been very largely upset.

In the past the relative first costs of the same structure, in order of magnitude, has usually been as follows: Untreated wood, treated wood, steel and concrete, while calculations for the annual charge to perpetuate a structure, taking into account the frequency of renewals, have modified this order, thereby justifying the construction of something other than a wooden structure for no other consideration than economy. Now, with much higher prices, we find that all materials have not increased in cost in the same ratio. Under some circumstances, the first cost of wooden stringers has been found to be greater than steel beams of equivalent strength and stiffness. In other instances, the concrete trestle has estimated cheaper than the creosoted ballast trestle.

In the discussion below several bridge engineers express their views and findings on this important subject. Obviously, conditions in various parts of the country are not entirely in agreement. It is not surprising, therefore, that some marked differences of opinion may be found in the remarks which follow.

The Effect Has Been Over-Estimated

I do not feel that the present price situation has as much bearing upon the relation between the cost of various types of railroad structures as might appear on first thought. For example—while concrete work might, a few months ago, have shown up more favorably than formerly in comparison with timber or structural steel, I believe that this spring's advances in the cost of labor, together with its impaired efficiency, have tended to restore the former relationship, owing to the fact that the cost of concrete is more largely made up of labor at the site of construction than is the cost of structural steel or heavy timber.

While it is no doubt true that the high costs of material are tending to put a brake upon all construction work, it is my impression, that except in cases involving a departure from common methods of construction, the relationship between costs of various types is not greatly disturbed. I think the choice of types is being more affected by scarcity of materials, particularly in structures where quick construction is necessary. For example—the present scarcity of reinforcing rods is doubtless tending toward the use of plain concrete or second-hand structural steel in certain cases where it is possible to substitute these types for reinforced concrete. —*S. L. Wonson, bridge engineer, Missouri Pacific, St. Louis, Mo.*

The First Cost Relation Is Still the Same

In common with the rest of humanity the railroad engineer has had to face many problems of high cost, material, labor, equipment—also food and clothing. The price of all materials entering into construction problems has advanced by leaps and bounds so that present prices of many materials are double the price of two years ago and three and four times the price that obtained when structures, now being replaced were built. This condition is too well known to need any elaboration. The question under discussion is whether this condition has changed the relative costs of various classes of construction to such an extent as to upset the generally accepted practice of the past.

The writer fails to see that it has. Notwithstanding the fact that structural steel and timber has outdistanced concrete materials in the high price race, labor and other factors more than make up the difference. In other words, the old order still holds—untreated timber structures are still cheapest, composite structures of steel and timber, treated or untreated, come next in order and permanent structures of steel and concrete still are the most costly. This, of course, referring to the first or construction cost.

The abnormal cost of materials and labor has brought about another condition. That is the tendency to defer permanent construction to some future date, because of the enormous sums of money required for even modest projects. The result has been the increasing use of a type of construction which may be called semi-permanent.

As applied to bridges, the construction consists of a creosoted timber substructure, either of piles or framed timber carrying I beam stringers, fabricated into chords, upon which rest the ordinary deck of ties. A bridge of this type is estimated to give from 20 to 25 years' service with very little expense of maintenance.

The cost of a bridge of this type is about 65 to 75 per cent greater than the ordinary timber trestle and from 65 to 75 per cent less than the cost of girders or slabs on a concrete substructure. By capitalizing the first cost of the three types, allowing for the usual maintenance costs, and assuming a service life of 10 years for untreated all timber bridges, 20 years for semi-permanent bridges and 30 years for steel bridges, the writer is of the opinion that the semi-permanent bridge is the most economical.

Should this type of construction be more universally used by railroads during this period of high prices? Would this help keep down capital charges at a time when a small permanent bridge costs thousands of dollars.—*J. E. Bebb, assistant bridge engineer, Michigan Central, Detroit, Mich.*

RAPIDLY CHANGING PRICES TEND TO VITIATE ESTIMATES

I am rather in doubt if comparative estimates would show a considerable advantage for concrete structures when compared with the cost for wooden structures or for steel structures. Today's prices are so variable that I believe estimates are of little value.

I have in mind a recent job where I called for bids for the sub-structure of a railroad structure over a tidal river, in which the costs for concrete were practically five times the cost for similar constructions in 1911 and 1912 and where the costs for ashlar masonry were also five times the cost in 1912. The timber used in this particular case was not extensive but the costs for creosoted lumber in place were about double. In other words, we are today paying $175 per thousand, in place, for timber that in 1911 would have cost from $75 to $85 per thousand.

For timber piling we are paying about three times the price of 1912, a 50-ft. pile today costing us about 24 cents per foot, whereas in 1912 the same quality of pile could have been bought for from 8 to 12 cents a foot.

We find in calling for proposals on a unit price basis that so many uncertainties are entering into the proposition that the cost is unreasonably high and cannot be accounted for by the increased cost of labor and increased cost of materials.—*J. J. Yates, bridge engineer, Central Railroad Company of New Jersey, New York City.*

THE PRESENT FAVORS PERMANENT CONSTRUCTION

Until the past year, so called permanent construction for minor railroad bridge structures could seldom be justified over timber construction, when the choice was made on the basis of cost alone. The present relation between costs of labor and material, and the extreme high prices of both, have in many cases reversed this, and we have the unusual condition of concrete structures capitalizing at a lower cost than creosoted timber construction. When concrete pile and slab trestles were adopted as a standard on this road in 1913, a trestle of this type for lengths of over 50 ft. and about 15 ft. in height cost about $30 per linear foot, as against $15 per foot for creosoted ballast deck trestle. At the present time, such a concrete trestle will cost about $57 per linear foot and creosoted trestle $37 per foot. If we capitalized the latter figures on the usual basis we have the concrete bridge at $60 per foot compared with $65 for the timber structures.

In addition to the item of cost, there is a scarcity of creosote oil, the indications being that the supply will fall greatly below normal requirements. This, aside from increasing the cost of creosoted timber, will reduce the supply of this class of material so greatly as to further limit its use so that when a structure of even semi-permanent nature is desired, concrete and steel construction must necessarily be seriously considered.

We are finding it necessary to give this subject a great deal of careful study, and are forced to consider the use of permanent structures on less important districts where in the past we have built nothing but timber bridges.

Aside from the comparative costs, however, it is necessary to be governed also by ability to get the work done as determined by the money and labor available. While the permanent structures may be more economical in the long run, they require a greater immediate outlay of money and also demand more labor which is exceedingly scarce. These two features will, no doubt, in many cases be the deciding factors and taken in connection with the shortage of creosote oil will make it necessary to exercise greater care in getting the utmost service out of present structures through more extensive repairs with untreated material., thereby postponing heavy programs of reconstruction.—*C. C. Westfall, bridge engineer, Illinois Central, Chicago.*

SOME INFLUENCE ON BUILDING WORK

Generally speaking, we find there are some changes in the use of materials which are most desirable on account of advance in prices. This is notably the case where concrete pipe is used extensively as opposed to cast-iron pipe. Also we find that in the construction of buildings, where the walls are of normal thickness, concrete may prove to be more economical than brick walls, and where the structure is simple in detail, concrete walls can be carried up to the window sill level of the building more cheaply than brick; but conditions are so diverse that no general rule can be given. The advance in the price of timber is greater than the advance in the price of steel, so that there are some cases where steel purlins can be used to advantage. However, our uses of timber have been rather limited, most of our structures being of a permanent character.—*F. P. Turner, bridge engineer, Norfolk & Western, Roanoke, Va.*

PRESENT CONDITIONS REACT AGAINST TIMBER

The greatly increased cost of certain construction materials, as compared with the increased costs of other kinds of such materials, has in a large measure upset the economic relations between the cost of wooden trestles and structures using materials producing a more permanent construction, such as concrete and steel, reinforced concrete and steel, steel stringers upon timber piles, or concrete slab, ballasted deck trestles supported on concrete piles. For pile and timber open floor trestles it is reasonable to assume that, to obtain a maximum length of life and at the same time conserve the timber supply, the timber, on account of its high cost and its short life untreated, would be creosoted or otherwise preserved. Under these conditions, especially for territories far removed from the timber supply, a concrete pile and concrete slab ballasted trestle may be designed at a cost within a sufficiently reasonable percentage of that of a creosoted timber trestle to warrant thorough investigation.

In the case of a creosoted pile and timber trestle with a ballasted floor (a length of 150 ft. or more to distribute the extra cost of abutment bents), with a reasonable length of piles, say 25 to 30 ft., it will be found that a concrete pile and concrete slab ballasted floor trestle

can be constructed at the same cost, depending upon its location with reference to timber regions as to wooden construction, and whether good gravel and sand are available at a reasonable cost for the concrete construction.

In the case of creosoted wooden stringers, three 8-in. by 16-in. stringers per rail for 12-ft. spans of open floor construction, it will be found that steel I-beam stringers, with somewhat longer spans, reducing the number of bents, may be used at an extra first cost of steel over timber of approximately 30 per cent. The steel stringers eliminate the fire risk, and the lasting qualities of steel over timber will, in the long run, show a balance in favor of the steel stringers.

The great increase in labor costs will have a tendency to produce structures in which the maintenance costs are low. This, in my opinion, will lead to the following developments in railway bridge practice:

1. The elimination of timber structures carrying railroad traffic on eastern railroads.
2. The adoption of concrete ballasted floor structures for all but long span bridges and those where the available floor depth is so limited as to prohibit them.
3. The encasement of steelwork exposed to locomotive gases, or salt air, or, where possible, the use of reinforced concrete construction.

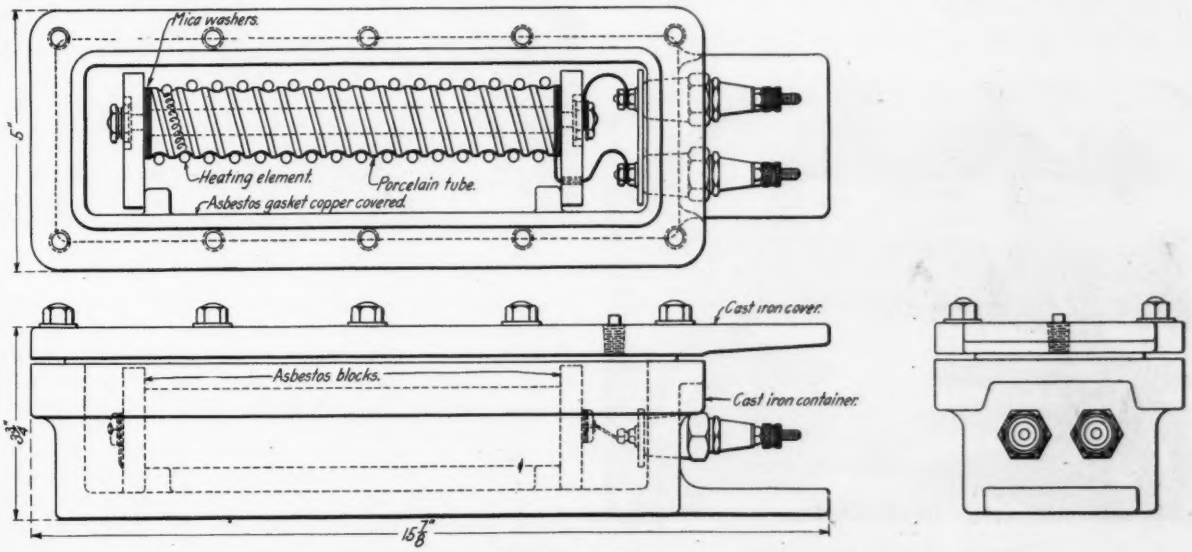
As a general proposition, it is my opinion that, based on capitalized costs, the rise in the costs of labor and material has resulted in a decreased economy in timber structures and a relatively increased economy in reinforced concrete structures. The great question, however, is whether the railroads will be able to finance the more permanent structures at an increased first cost, or will they be forced to adopt the cheapest construction in all senses of that word?—*F. E. Schall, bridge engineer, Lehigh Valley, Bethlehem, Pa.*

Facilitating Switch Movements in Winter

DURING THE snowstorms this winter, which seriously demoralized traffic in and around New York City, the switches on the Electric division of the New York Central were kept open for prompt operation through the winter season by means of electric snow melters installed under the switch plate. These melters or heaters, known as the Boardman Snow Melters and manufactured by the Q & C Company, New York City, are the result of a series of developments made on the New York Central.

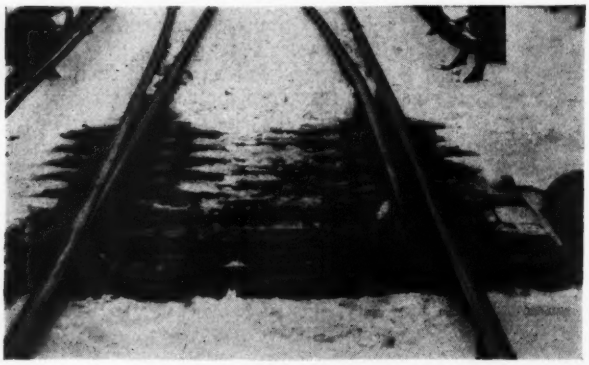
The latest form of this device, as used on this road during the past winter, consists of a simple heat unit encased in a waterproof cast-iron box, measuring 15⅞ in. by 5 in. by 3¾ in. These are placed loosely under the rails and between the ties wherever it is desired to keep the snow from accumulating, the current being brought to the heaters by insulated wires laid under the tracks, where they are fastened to the sides of the ties. The number of heaters required depends upon the amount of space it is desired to keep clear of snow. In general, it will be found that 16 of these heaters to each turnout having 15-ft. or 16½-ft. switch points will be ample to keep the switch clear under the most severe weather conditions. Where the prevailing wind is at an angle to the track the heat loss, due to radiation, is decreased and a smaller number can be used. The electric switch is placed at some convenient point in the line bringing current to the heaters and can be turned on when a snowstorm starts and turned off at the conclusion of the storm, so that current is being consumed only when actually needed. The entire installation can be removed at the end of the winter season, thus leaving the track free for general maintenance work during the remainder of the year.

In addition to keeping the switches open and in operation on the New York Central this past winter, it was found that this could be accomplished with very little hand labor. The least amount of labor was used at Mott Haven junction, where the tracks of the Hudson and Harlem divisions diverge, the latter division being used also by the New York, New Haven & Hartford. There are a total of 21 switches at this point to be kept clear, and of the 508 trains a day which pass through this junction approximately 75 per cent of them makes some diverging movement from one track to another—that is, at least one turnout or crossover has to be op-



Details of the Heating Unit

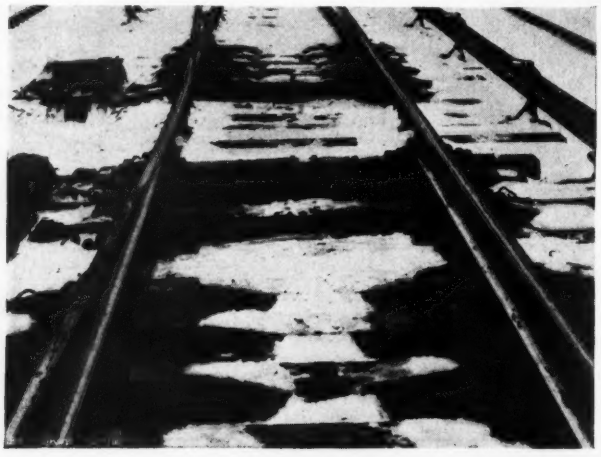
erated to permit the trains to pass. During the rush period trains are run on a 2½-min. spacing, and this schedule is only possible with prompt and normal operation of the switches. The embankments and tracks at this point run in different directions, so that the different rails form to some extent a windshield which tends to keep the radiation loss down to a minimum. Throughout the worst of the storms all of these tracks were kept clear with only a foreman and three laborers present



Results Obtained in Heavy Snow

who inspected and watched the operation; and there was no delay to trains. Before the heaters were installed a gang of 25 to 30 men were used and even with this number it was not always entirely possible to prevent some delay to the trains, as under the old method it was necessary to sweep out each switch just before it was thrown. The conditions at Mott Haven junction were possibly more favorable than at other points and may be taken to show the best results that can be obtained from the use of these heaters.

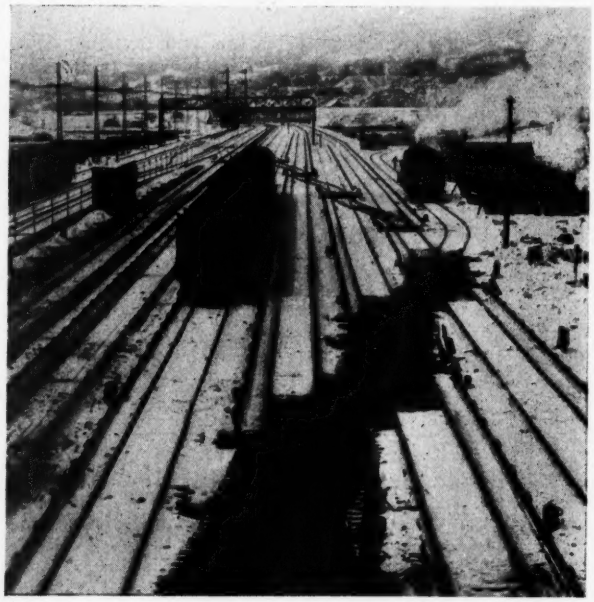
The most severe test occurred at Harmon, about 32



View of a Typical Installation

miles from New York City, where the 4-track main line of the New York Central parallels the Hudson river. A large number of the switches along the line at this point are exposed to the direct sweep of the wind coming a long distance over the ice of the Hudson river, with the result that a large amount of snow is collected and driven against any obstructions which may be offered it. A total of 191 trains a day pass through this point and of this number 83 change from steam locomotives to electric, or vice-versa, the time allowed for this change being four minutes. Necessarily a number of switches have to be thrown to allow the engine of the incoming train to clear in order that another engine may couple on. Occasionally more than one train is changing power at the same time, which doubles up the number of switch movements necessary during the four-minute period. Before heaters were installed at this place traffic was often completely tied up under severe weather conditions, the main reason being that between the time the men cleaned out the space between the switch point and the rail and gave the signal to throw the switch it would be again filled with snow and the towermen were unable to get the switch over in time to get their lock and the correct signal indications.

During one evening in March there was a severe rain, changing later in the evening to snow and accompanied by a severe drop in temperature. The water and melted snow from the night before were still in the switches, so that by the beginning of the rush hour period the switches were found to be frozen solid. The electric heaters were turned on and the ice melted, but as a 70-mile-an-hour



A Set of Three Slip-Switches Well Thawed Out

wind was blowing, the heat was carried away so rapidly that a thin crust of ice was formed above the slide plate, which had to be broken from time to time in order to operate the switch point. However, under the most severe conditions it took from seven to eight minutes for these crusts to form hard enough to obstruct the movement of the switch point, so that any difficulty arising from this was obviated by having a few men whose sole duty was to go around breaking out these crusts. Under these conditions a foreman and eight men managed to keep 22 turnouts and 6 double slips in service and no trains were detained.

The cost of operation of these heaters is substantially the cost of the current consumed, the individual heaters each consuming 600 watts, which would give an approximate power consumption of 9.6 kw. per turnout. Where the cost of the current is low the cost of keeping these switches clear is cheaper than by means of hand labor. Under present labor conditions the question involved in this type of heater is of distinct interest because of the fact that it is not always physically possible to get men enough to work on the switches when the necessity arises.

MANY INFLUENCES NOW AFFECTING TIE PRODUCTION

Disturbances in Long-Established Methods, New Specifications and Threat of Strike Among Timber Workers Restrain Output

THAT THE CROSS tie industry is going through a period of widespread changes was evident from the discussion at the first annual convention of the National Association of Railroad Tie Producers which was held at the Hotel Sherman, Chicago, on April 22 and 23. This association, which was formed at St. Louis in January, 1919, comprises within its membership many of the larger producers of railway cross ties, particularly in the middle-west.

A considerable number of railway men were also present at the various sessions, participating in the discussion in a number of instances.

The officers of this association for the past year were: President, John W. Fristoe, president, T. J. Moss Tie Company, St. Louis, Mo.; vice-president, E. M. Blake, production engineer with Chas. R. McCormick & Company, San Francisco, Cal.; secretary of board, Robert E. Hussey, vice-president and treasurer, Hussey Tie Company, St. Louis, Mo.; treasurer, Robert E. Lee, president, Hobart-Lee tie Company, Springfield, Mo., and secretary-manager, O. A. Pier, St. Louis, Mo.

A number of the papers which were presented at the convention are of particular interest to railway men. These are abstracted below.

J. W. FRISTOE REVIEWS PRESENT SITUATION

In the opening session of the convention, J. W. Fristoe, president, reviewed the developments of the past year and commented on the future in part as follows:

Up to a few months ago our industry was dominated by substantially the same authorities that controlled our railroads. Published prices were offered to any and all producers, and yet I have been reliably informed that on two of our largest tie-producing railroads substantially three-fourths of all the cross ties purchased by them under federal control, were obtained from firms or individuals who had been previously known and established as tie contractors. There certainly could be no more convincing proof of the necessity and usefulness of efficient and established organizations of men and capital who make a business of the production of cross ties, unless it was the immediate decision on the part of these two producing roads to purchase their cross tie supplies through line contractors as soon as they were permitted to do so.

The return of the railroads to private management is the most potent event recently affecting our industry. We are again in the status of buyer and seller, and we must watch carefully the signs of the times in our investments and sales obligations. The law of supply and demand is now working again, after having been suspended temporarily by governmental action.

The question of the uniform application of a standard specification for cross ties is indeed a live problem, but I am forced to infer from observations of the present trend of events that the answer to this question will not be and cannot be, determined by any action of this association, but through the creation of a universal demand among all of the first class railroads for cross ties conforming to standard specifications.

We may endorse, and we have endorsed, the principle of a standard specification and the uniform application of the same, but until the railroads, collectively and universally, refuse to purchase cross ties on any other basis, there can be no concerted action or binding resolutions. With all personal desires and wishes beside the issue, the influences making up the demand for cross ties do not at present indicate any universal desire for a standard specification in actual cross tie purchases, and likewise the supply of cross ties at the present time, counting those within and those entirely without the requirements of heretofore standard specifications, is beyond doubt inadequate.

The demand for cross ties, as expressed in the best of all barometers, that is actual and bonafide inquiries, has caused a number of us to invest additional capital as fast as we could properly do so on the assumption that increased production must come through the employment of additional labor and equipment. Coincident with our desire for increased production, the demand for other necessities is even greater than that for cross ties, and credits have been generally expanded to such a point that interest rates are a matter of grave concern.

The purchase and production of cross ties is a peculiar business wherein we perforce must make large and substantial investments considerably in advance of the actual date of delivery of cross ties to our customers. We in turn sell our cross ties on a basis of what sometimes becomes a short term loan. Good business always prompts us to keep our aims well within our means, and a tight money market may probably restrict the production until this situation is relieved. Let me emphasize that we shall need all the help possible from our customers in obtaining equipment to more rapidly turn over our stock, and we must expect prompt remittance if we are to increase production.

THE PRODUCTION OF CROSS TIES ON THE PACIFIC COAST

It is only within the last two years that ties from the Pacific Coast have been used in appreciable numbers on railways outside that area. However, particularly in 1919 large numbers of such ties were shipped to all parts of the United States. Much interest has naturally been created in this new source of supply of ties for roads in the central and eastern states. The possibilities of the western states as tie producers were described by

E. M. Blake, production engineer for Chas. R. McCormick & Co., San Francisco, Cal., from whose paper the following information was taken:

Based upon the most reliable information obtainable, there are in the United States today probably about 550,000,000 acres of standing forest, including both privately owned and public lands. Of this total there are about 80,000,000 acres in the Pacific Coast states of California, Oregon and Washington. Although a relatively small percentage of the whole, it is estimated there are about thirteen hundred billion board feet of standing timber on these 80,000,000 acres, which is approximately one-half of the remaining supply of standing timber in the United States. About one-half of this quantity, or 630 billion board feet, is estimated to be Douglas fir, representing about one-quarter of the total timber stand in the United States today. Of the total of thirteen hundred billion board feet, about 340 billion are found in the State of California, about 510 billion in the State of Oregon, and about 450 billion in the State of Washington. It is interesting to note, in comparison, that the total stand of yellow pine in the southern states today, based upon figures recently compiled, is probably not much in excess of 225 billion board feet.

The following figures give an approximate idea of the relative stands in 1920 of the various kinds of timber in the Pacific Coast states:

Timber	Location	Billions of Board Feet
Douglas Fir	California	65
	Oregon and Washington	565
Redwood	California	75
White Pine	California and Southern Oregon	120
Sugar Pine	California and Southern Oregon	35
White Fir	California and Southern Oregon	40
Cedar	California and Southern Oregon	10
Other Species	California and Southern Oregon	10
Spruce	Oregon and Washington	50
Cedar	Oregon and Washington	60
Hemlock	Oregon and Washington	85
Western Yellow Pine	Oregon and Washington	125
Western Larch	Oregon and Washington	20
Other Species	Oregon and Washington	40
Total stand, estimated		1,300

The present relation between the annual production of lumber and the resources of the Pacific Coast states gives an indication of the future possibilities of that district. The three states combined, in 1918, produced about 8,500,000,000 board feet and in 1919 about 8,800,000,000 board feet. The estimated total lumber production in the United States for 1919 is placed at about 30,000,000,000 board feet as against about 32,750,000,000 in 1918 and 36,000,000,000 board feet in 1917. The recent shortage is said to be principally in the southern pine output. The normal annual lumber export total from the Pacific Northwest is approximately 600,000,000 board feet but the total exported in 1919 was probably less than 400,000,000 board feet, this reduction being accounted for by conditions brought on by the war and the acute shortage of available tonnage.

Relation Between Cross Tie Production and the Lumber Industry

In the southern states, along the valley of the Mississippi River, in the north central states, and in the East, where probably over 90 per cent of the annual requirements in cross ties has been produced in the past, a large portion has been cut by companies organized for that purpose whose principal business is the manufacture of cross ties. These companies vary from the larger concerns which handle the output of many tie producing areas down to the small local companies. Large quantities of hewed ties have also been cut by individuals. In other words, in the districts east of the Rocky Mountains, tie production is quite generally a distinct and separate business by itself, although many ties are produced in connection with mills whose principal output is lumber in other forms.

West of the Rocky mountains, in the states of California, Oregon and Washington, the conditions at present are practically reversed. The manufacture of cross ties on the Pacific Coast is largely incidental to the lumber business. While the number of hewed cross ties produced annually on the Pacific Coast is small in comparison with the number of sawed ties, still a large number of split and hewed redwood and hewed fir ties are produced each year outside of the mills. There are also many tie sawmills in the Lewis River district of Southern Washington and along the Willamette Valley in Oregon. The production of cross ties, however, has been principally a mill problem of secondary importance and the annual output of cross ties in the future will depend, aside from the pressure of the demand, upon the attitude of the lumber mills toward the manufacture of this particular railway timber product. This, in turn, will depend upon the specifications, inspection rules and prices controlling the transactions.

The production of cross ties on the Pacific Coast in 1919 probably represented only from 6 to 7 per cent of the total lumber production, from which it is evident that cross ties today are a relatively small factor in the lumber industry. Probably over 90 per cent of the Douglas fir ties manufactured on the Pacific Coast are sawed in lumber mills from logs of large dimension because the average stand of Douglas fir trees is of large size and it has not paid to log the smaller trees except for use as piling. Therefore, the conditions and problembs which are encountered in the production of cross ties on the Pacific Coast are quite fundamentally different from those which influence the tie situation east of the Rocky mountains.

Douglas Fir Ties

The principal sources of supply of Douglas fir ties are as follows:

Washington: in the Bellingham and Everett districts, on the Olympic peninsula, in the Gray's Harbor and Willapa Harbor districts, in the Lewis River district of Southern Washington, along the Columbia river and in general back to and occasionally east of the line of the Cascade mountains.

Oregon: along the Columbia river, in the Coos Bay district, along both sides of the Willamette river and generally in the west central areas of the state from the Willamette river to the coastline.

California: in scattering areas along the coast from the Oregon line nearly to Santa Cruz, in the Mt. Shasta region of north central California, and along the slopes of the Sierra Nevadas as far South as the Yosemite Valley district.

In connection with the use of Douglas fir it is interesting to note that the great durability and resistance to saturation by water of Douglas fir and its great mechanical strength combined with its lightness in weight particularly fit it for use in the form of cross ties. The unusual refractoriness of its cellular structure has, in the past, tended to limit the treatment of the heartwood with creosote oil or other preservatives but the recent development and perfection of the mechanical perforating process assures a greatly increased use of treated Douglas fir in cross ties in the future. Douglas fir also grows very large in size and very dense in stand and the number of hewed ties is very small, most fir ties being sawed from the logs. The stands commonly run

over 1,000,000 board feet to the acre. Individual trees run up to 14 ft. and 15 ft. in diameter and over 300 ft. in height. They often grow to a height of 150 ft. without a single branch. Structural timbers 18 by 18 running from 120 ft. to 140 ft. in length and timbers as large as 36 by 36 and even 46 by 46 running from 50 ft. to 80 ft. in length are readily available. On account of its large average size, therefore, it is probable that the majority of Douglas fir cross ties will generally be manufactured from the heartwood of the timber. Douglas fir grows under such a variety of climatic and soil conditions that its exterior physical appearance varies considerably in different localities.

REDWOOD TIES

The principal sources of redwood ties are in Mendocino, Humboldt, Sonoma and Marino counties, lying along the coastline north of San Francisco, from which areas ties are shipped both by rail and water. A smaller quantity of redwood ties is produced annually from the Santa Cruz district, lying along the coast south of San Francisco, and including the Big Basin in which is located the California Redwood Park. Ties cut in this district are shipped by water from Pigeon Point, by water and rail from the Santa Cruz district, and also by rail from Mayfied and other points around the Big Basin district. No redwood cross ties are cut in the district near the Yosemite Valley.

In connection with the use of redwood for cross ties it is interesting to note that the growth of redwood trees is very large and the stands are very dense. There are a number of instances recorded where single acres of redwood trees have yielded more than one million board feet of lumber. The secret of the great age of these trees, many of which are claimed to be several centuries old, is in their natural resistance to rot and fire and their practical immunity to the attack of insect life and fungus growth. The majority of redwood ties, probably 85 to 90 per cent, are split from the logs, many of them from the logs as they lie on the hills after being felled. The splitting is usually followed by some hewing, constituting a large volume of work every year. About 10 to 15 per cent are sawed, most of which are for export.

Cedar ties are manufactured principally in the Coos Bay district of Southern Oregon. Cross ties of other kinds of wood, including hemlock, larch, spruce, cedar and western yellow pine, are produced on the Pacific Coast but only in relatively small quantities.

THE AVAILABLE MARKETS

The principal markets for the sale of cross ties produced on the Pacific Coast have been as follows:

1. Local markets in the states of Washington, Oregon, California, Nevada and Arizona to meet the requirements of the steam and electric railroads, industrial lines, logging roads and mining tracks.

2. Domestic markets for the supply of railroad requirements between the Rocky mountains and the Mississippi valley. While ties have been shipped to those markets in the past, principally for use on railroad lines in Montana, Idaho, Wyoming and the Dakotas, during government control of railroads, large numbers were shipped for widespread use in other sections of the district above defined.

3. Domestic markets for the supply of cross tie requirements to railroads in the Atlantic seaboard district north of the Carolinas and east of the Mississippi valley. Shipments to these markets were inaugurated under government control of railroads and ties were shipped from the Pacific Northwest in vessels through the Panama Canal to the Atlantic ports of New York, Philadelphia and Baltimore.

4. Foreign markets have been supplied with cross ties from the Pacific Northwest for a period covering about ten years. Large numbers of creosoted Douglas fir ties have been exported to India for the British Indian Railways. Heavy shipments have also been made in the past to China, Mexico, Central America and the west coast of South America. At the present time negotiations are under way, if not already completed, for the shipment of 3,000,000 pieces of cross ties to China for use on extensive railway construction work contemplated in that country. Since the signing of the armistice in November, 1918, many shipments of Douglas fir ties have been made to the United Kingdom and inquiries, which have not yet been followed by actual orders, have been received from Italy, France, Belgium and South Africa. The export of ties from the Pacific Coast during the past year would have been much larger had the tonnage been available.

The domestic use of cross ties in the Pacific Coast region is dependent upon the annual requirements of the steam and electric railroads. These railroads have purchased cross ties in the past at points resulting in the most economical distribution and for use on specific mileage which is carefully studied out. For instance, the Great Northern has been the purchaser of Douglas fir cross ties principally for that portion of its lines west of the summit on the Cascade mountains and has supplied its lines in Washington east of the Cascades, and in Idaho and Montana with ties purchased in the Bitter Root and Rocky mountain timber districts. The Southern Pacific has been the purchaser of Douglas fir and redwood ties to supply the requirements of its entire system as far as El Paso, Texas. The Oregon-Washington Railroad & Navigation Co. has been the purchaser of Douglas fir ties which are supplied to its own lines, to the lines of the Oregon Short Line Railroad and to part of the Union Pacific.

It has been impossible to secure completely accurate data on the mileage of main and branch lines and yard tracks and sidings of all the western railroads which depend upon the Pacific Coast district for ties, but it is estimated that this track mileage aggregates 28,860.

It has been possible to secure some information on the actual tie requirements of these railroads in 1919, covering the ties produced for them in California, Oregon and Washington. The majority of these ties were 7 in. by 8 in. by 8 ft. in size. The O. W. R. R. & N. C. uses 7 in. by 9 in. by 8 ft. ties on its main lines and the Southern Pacific 7 in. by 10 in. by 8 ft. ties. Redwood ties, except those exported, are all cut for use on western rail lines. At the present time it is probable that between 25 and 30 per cent of the cross ties used on western rail lines are redwood, about 70 per cent Douglas fir, and the balance other woods. The figures obtained indicate that the total cross tie requirements of the Pacific Coast rail lines in 1919 were approximately 8,700,000 pieces.

THE PRODUCTION OF CROSS TIES IN 1919

The estimated production of cross ties in the states of California, Oregon and Washington for the calendar year 1919 by distribution of woods and distribution of markets, is as follows:

Douglas Fir	No. of Pieces
For Pacific Coast railroads	5,710,000
For inland and eastern railroads by rail	3,850,000
For inland and eastern railroads by vessel	1,225,000
For export to United Kingdom	1,579,400
To west coast of South America	46,200
To Mexico	2,100
Estimated total for Douglas fir	12,412,700

Redwood	
For Pacific Coast railroads	2,575,000
To west coast of South America, etc.	200,000
Estimated total for redwood	2,775,000
Cedar for Pacific Coast railroads	175,000
Yellow pine, western larch, western spruce, western hemlock and other kinds for Pacific Coast railroads	250,000
Estimated total production, 1919	15,612,700

Previous to Government control of railroads, cross ties were cut and sold in the Pacific Coast states under specifications and grading rules established by the separate railroads and were accepted by those roads upon reports of their own inspectors. With the advent of Government control, a standard specification was adopted and published, prices were fixed and specific inspection and grading rules established. Government inspection forces were centralized in the various districts under supervising inspectors. The changes thus made in the local practices on the Pacific Coast were rather abrupt in many cases, particularly as to the de-grading rules, and it was difficult at first for many of the mills to adjust themselves to the new conditions. It is probable, however, that the standard specifications drawn up, adopted, and in use by the United States Railroad Administration, as approved in Washington, D. C., on June 11, 1918, are recognized by the majority of tie manufacturers on the Pacific Coast as comprehensive and satisfactory from the mill point of view and as a distinct improvement in many particulars over the former specifications. Many points brought out by government specifications have undoubtedly been welcomed by both the mills and the railroads in the Pacific Coast district and these will probably be retained now that the roads have gone back to private operation.

THE POSSIBILITIES OF THE FUTURE

Quantity production of Douglas fir cross ties in Oregon and Washington is capable of almost unlimited increase in the future provided the conditions controlling production are favorable. These conditions are based fundamentally upon a purchase price balanced with the requirements of both specifications and inspection rules. It is anticipated that the use of Douglas fir lumber will steadily increase to meet both domestic and foreign demand and if heartwood cross ties of close grain wood are called for in future specifications, their price again must be rationally balanced with the market for the higher priced lumber products inasmuch as these lumber products, bringing the higher prices, can be manufactured by the mills from the same logs which would be used in the production of the majority of cross ties.

As the quality specified and the consequent cost of cross ties has advanced it has been a matter of prudent economy to give them some form of preservative treatment in order to get the maximum life out of the higher priced tie. Thus it is that sapwood ties are rapidly going out of use and heartwood ties are taking their place at the higher price which heartwood commands.

With regard to redwood ties, their production will probably be limited to a percentage of the requirements of the western rail lines, for use generally in arid climates, and to meet certain export demand. There is only a relatively small amount of new growth redwood trees, and reforestation is taking place principally on Government reservations. Furthermore, very decided efforts are being made to save the redwood forests of California from further so-called inroads of commercial lumbering. While this movement is probably not destined to bring about any marked conservation in the commercial use of redwood, particularly on account of the great demand for this wood for building purposes, still it tends to limit the use of redwood for cross ties. Therefore, it does not appear probable that the future production of redwood ties will increase much above the normal annual output at the present time.

In conclusion, the railroad cross ties, produced on the Pacific Coast have been very largely a by-product of the lumber mill. In logging operations today, the smaller growth is left untouched except as removed for piling. With an increased demand for cross ties, however, this smaller growth will doubtless be hewed into ties or cut up in portable or small permanent tie sawmills. Therefore, it is quite entirely within the range of possibility that tie production on the Pacific Coast may become in the future a distinct and seperate business of itself, as it is east of the Rocky Mountains, correllated with but independent of the lumber mill and in the wake of the larger lumber logging operations, the great forest areas of the Pacific Northwest may offer employment to thousands of laborers in the splitting and hewing of cross ties from the smaller growth and in the lesser logging operations connected with portable or small permanent tie sawmills. Whatever form the production of cross ties on the Pacific Coast may take in years to come, it is undoubtedly the destiny of Douglas fir to fill the most important part, representing as it does about one-quarter of the total stand of timber in the United States today. Mechanically perforated promptly after its manufacture to control or prevent checking, to hasten air seasoning, and to insure a uniform predetermined penetration of preservative, then economically treated with the maximum conservation of oil possible and with the vitally important reduction of time and temperature made possible by perforating, it is doubtful whether any cross tie timber will give a better account of itself in the track bed than Douglas fir.

Although reforestation has so far been carried out in the Pacific Northwest on only a small scale, it is the opinion of expert timber engineers, recently expressed, that Douglas fir is growing at a rate equal to that at which it is being cut today and that, at the present normal rate of growth, the present supply of standing Douglas fir timber will be entirely reproduced in about one hundred years. It is the opinion of these engineers that there is enough timber in the Pacific Northwest today to maintain the entire country's supply for about a hundred years.

REFORESTATION AS A BUSINESS INVESTMENT

The possibility of reforesting cut over tie land in a manner to make it commercially practicable was discussed at length by Howard Andrews, president of the Nashville Tie Co., Nashville, Tenn. The following is an abstract of his paper on this subject:

There is sufficient land not suitable for agriculture to provide a perpetual supply of timber, and if taken in hand now, at the end of 50 years there would be as much timber in the country as there is today. I wish to show you that forestry or reforestration methods can be made a safe and profitable business investment. In many cases tracts of timber are cut every 5 or 10 years for cross ties, and the revenue that comes in this way from a tract of timber even without any kind of care or attention between cuttings is surprising.

I believe that a good tree can be raised on a square rod of land as easily as a farmer can raise two stalks of corn in hills three and one-half to four feet apart. It is my observation that an average tree protected from fire and in only reasonably good soil will increase in diameter ¼ in. per year. Now, suppose a tree that is 12 in. in diameter with a body length of 32 ft. becomes a tree 13

in. in diameter in 4 yr. This represents an increase of 8½ ft. b. m. per year. Take an acre with 160 trees and this makes an aggregate gain of 1,360 ft. b. m. per year.

I am not an ardent advocate of planting new trees to any great extent on ordinary cut-over land, although this may be a wise thing to do in many instances, but there are scattered over the country so many tracts of land, large and small, which have been cut over and on which there are young growths of native trees which can be utilized for our future timber supply. Just leave such land alone, keeping the woods fires out as much as possible, and the growth of timber will more than pay 6 per cent on the investment, and added to the growth is coming the enhancement in stumpage values which is sure to be freat in thecourse of the next 10 to 30 years.

However, to secure most efficient results, a system of practical forestry should be used on such timbered land. For instance, not oftener than every five years, or perhaps 10, it would pay to work over the land and cut trees where they stand too thick, remove those of inferior growth, or even cut all of the trees of marketable value. However, I would recommend that such occasional working of the forest be done more as a farmer weeds his corn or other growing fields, leaving the promising young growing trees to mature.

Certain classes of what is known as second growth timber will reach maturity in the course of 50 years or so, and the trees begin to rot, die and deteriorate if not cut then. Other classes of timber will grow indefinitely to a large size if given the right kind of a start and the trees around are not too thick. Circumstances and conditions should govern the age or size at which to cut the trees, or, rather gather the crop of lumber or ties.

I would say that, without an attempt to market the timber on a given tract of land, the work of one man for one day would take care of an acre for probably five years. This day's work would represent a considerable investment on a large tract of land, but it would be repaid severalfold by the increase in growth. This man should fell non-productive trees which detract from the growth of good trees, and in a general way weed the crop of trees as other crops are weeded. If a market for cord wood could be found to clean up such cuttings, it would help considerably, even if there was no profit from the sale of the wood. Supplementing all this must be the precaution to keep fire from running through the woods and stunting the growth and causing defects in the trees old and young. Such cared for timber will show 5 to 10 times better results than timber left to its own resources.

The feeling of the average timber man, lumberman or tie man is that there will be enough timber for his life time, so why worry about the distant future. I maintain that tree growing can be made a good present-day business, a little slow, perhaps, but sure. The quick dollar presents a strong pull, but from a commercial standpoint there is nothing wrong in the theory of profits gained by enhancement of value, even though an actual sale is not made. If $5.00 per acre land can be made worth $25.00 in ten years, with very little expense, who can deny there is a present-day profit. There is certainly a profit each year if an acre will grow 1,000 feet board measure of timber, and such an acre is worth more at the end of the year, depending on the money value of the stumpage.

I know of a 10,000 acre tract of land which was bought four years ago for $30,000. In the four years $25,000 worth of timber has been taken off and the land and young timber now remaining are worth $35,000 and will be worth double this in five more years. On this tract the fire has been kept out, the cutting of trees has been done in a practical manner so as to leave the best young trees growing. In this location there has been a fair market for cord wood which helped to clean up the woods and make conditions good for timber growth.

In discussing Mr. Andrews' paper, Robert E. Lee (Hobart-Lee Tie Company, Springfield, Mo.) stated that there are large areas of timber in the Ozark mountains of southwestern Missouri, some of which have been worked over as much as eight times. It is the practice to go over these areas every five years, in which it is found that the average annual growth of timber is five ties per acre. Mr. Lee and other speakers urged the reduction of taxes on such lands as a means of encouraging owners to permit them to remain in timber.

A PROPOSAL FOR A CENTRAL INSPECTION BUREAU

No single action of the Railroad Administration created more discussion than the issuance of standard uniform specifications for cross ties and the development of a central inspection bureau. With the return of the roads to private operation, these measures have become inoperative except as supported by the individual roads. As a result, the suggestion on the part of a tie producer that a central inspection bureau be formed is of special significance. This suggestion was made in a paper by Warren C. Nixon, which is abstracted in the following:

I believe in a standard set of specifications universally applied both in the manufacture and taking up of ties which will permit the following results:

A. Any railroad under the specification may buy whatever it may want to, whether it be a large tie or a small tie, an oak tie or a gum tie.

B. The specification will permit the producer to utilize his rapidly depleting timber to its very limit with the least possible watage.

Having due regard for the existence of a standard specification, I must believe in the right of every railroad to buy any sort of a tie it wants; that is, to buy and to get any class of tie under the specification, and I would want the specification so complete as to cover all the possible requirements of every railroad. But I do not believe that a railroad which buys a No. 3 tie should attempt to get a No. 4 when the inspection starts, nor do I believe in a railroad buying a No. 3 and then accepting No. 2s and No. 1s as No. 3s.

I do not believe in a railroad attempting to buy a No. 3 tie for a No. 2 price. In other words, the sane, clean way of handling the entire tie business would be for railroad A to buy from producer B a certain number of ties as No. 3s, 2s and 1s—for the producer to know that the railroad was going to take exactly those ties and no others, and for the railroad to know that its representatives were going to get those ties and no others.

Various inspection bureaus have been in existence for a great many years, such as the Southern Pine Manufacturers' Association, the National Hardware Manufacturers' Association, the Pacific Coast Lumbermens' Association, etc., so that the idea of a standard specification and a standard inspection is not particularly new to the tie industry. The first time that a plan for a tie inspection bureau was really seriously presented was, I believe, in 1916, when the Tie division of the Lumbermen's Exchange in St. Louis addressed a letter to the presidents, purchasing agents and chief engineers of several different railroads, which were then inspecting cross ties in the St. Louis yards of various contractors. As a result of the condition of Missouri

State rates, practically all of the ties then moving through St. Louis were being shipped into St. Louis by producers, unloaded and stored in yards and were then being inspected as they were loaded out for the various railroads. The germ of the entire idea was contained in a letter which was addressed to various officials of railroads by the Lumbermen's Exchange, representing, as it did at that time, practically all of the producing tie manufacturers in St. Louis.

The letter was merely a request for consideration of the plan, and was in no sense a direct request for action. It outlined the general situation in the St. Louis yards, gave approximately the number of railroads who were accepting ties at St. Louis, and the number of inspectors they were maintaining at that point. It suggested that for a period of 60 to 90 days, railroads agree to turn over to a certain bureau, operated at the expense of the Lumbermens' Exchange, all of these inspectors, giving them leave of absence without pay for this period. Railroads were then to contribute to the inspection bureau the pay and average expense of these inspectors for an equal period. The entire distribution of the inspectors, as among the various yards, was to be handled by the inspection bureau, and the various men were to be shifted from day to day in order to do away with any possibility of favoritism, and in an effort to eliminate entirely the human element. The Lumbermen's Exchange guaranteed the railroads against any possible damage or loss, agreed to replace promptly without argument the ties which they might receive under this arrangement, which were not satisfactory to them.

It was a well known fact that the number of inspectors in St. Louis was far in excess of the number required for the work they were doing, and that it would be possible to make all the inspections with perhaps half the number. However, none of these inspectors were to be laid off, but the inspection bureau was to keep such records, together with such information as regards the actual time employed by the inspectors, as to give the railroads information at the end of the period as to how much of a saving could have been made.

During the operation of the experiment, it was suggested that various chief inspectors, chief engineers, etc., of the interested railroads be invited to visit St. Louis and observe the plan in operation. It was hoped, if the scheme was a success in St. Louis for 60 days, to maintain it indefiinitely in St. Louis and later on to broaden it to include, at least, the Southwestern tie producing territory, and eventually to have it grow into a national organization.

The net result of the whole suggestion was absolutely nothing.

In the meantime, the war came on and the people who were back of the idea became scattered and the whole thing was dropped. Later on, as a result of the Federal control of railroads, what amounted to a central inspection bureau was put into effect, except that this inspection bureau was conceived in error, because it was controlled entirely by one of the parties to the contract. In other words, inspectors, inspection, specifications, etc., were entirely under control of the Federal government, which to all intents and purposes was the owner of the railroads and producer of the ties. When Federal control of railroads ceased, the officials of such Federal control attempted to pass along to the tie business a central inspection bureau, which was to be controlled and operated by the American Railroad Association. The proposal was never agreed to, or even seriously considered by the tie producers, because it was felt that an inspection bureau of any sort should be properly neutral in its make up, both in its control and in its operation. As it stands today, we are no further along than we were 10 years ago, as regards a central inspection bureau.

I submit the following as being a tentative plan for the organization of such a bureau which would be entirely neutral in its organization and neutral in its administration. The cost of such a bureau can be borne as may be determined in the future, either entirely by the railroads as a part of the cost of the cross ties, or by the tie producer as a part of the cost of production of cross ties, or by both.

I would have the producers' association appoint three representatives as members of a board of directors. I would have the American Railroad Association appoint three of their number as members of a board of directors; these six would meet and among themselves determine upon a seventh man, who would become president and general manager of the inspection bureau. I would have these seven people organize a corporation as its board of directors, the corporation to be organized under the laws of any state, according to the then existing conditions. Its purposes would be to operate a central inspection bureau for the inspection of cross ties without any attempt to make a profit thereon.

To sketch briefly the division of authority in the bureau, I would have under the president on complete department in charge of a high class, high salaried man, which department would take care of costs, statistics, accounting and the general business management of the bureau. The second department would be in charge of a practical, high class man who knew timber and timber products, and it would be under his direction that the inspectors and the regional inspectors would be hired, fired and controlled. I would place the offices of this corporation probably in Chicago, as being a central point, and I would establish branches of the bureau in whatever various cities experience might show necessary.

To start with, I would place a fixed charge per tie, say for the first year, on all ties passing through the bureau, and then later on if I were over I would return to the railroads and producers equally whatever amount I might have left, and if I were short I would assess them whatever amount might be necessary.

Here is how the inspection bureau would work: Railroad A would be in the market for 100,000 ties, part No. 3, part No. 2 and part No. 1. It would send its inquiries to any producers it might see fit to call upon for quotations. We will say that producer B secured the contract. This contract price might be F. O. B. cars plus inspection, or it might be F. O. B. cars less inspection. It would be immaterial whether the inspection was paid for by the producer or by the purchaser, as the amount in every case would be fixed and would, in any event, go to the central inspection bureau for taking care of its expenses. When ready to load all, or any part of the ties producer B would notify the nearest office of the bureau, giving date ready for inspector, probably number ready for inspection, approximate line up, etc. When producer B had no cars for the inspector, or no ties, the inspector would merely report to his office and go on another job. And railroad A would not worry, for it would know that its ties would come to it as ordered, as far as humanly possible.

Can anyone deny that such a plan as this would result in the saving of a tremendous amount of money paid out for the services of inspectors. A central bureau operated as indicated would eliminate from the ranks of tie inspectors all incompetents and loafers who hold their jobs now by virtue of favoritism, or similar

cause. It would mean that no producer would know what particular inspector he was going to have, but he would know that if he had sold a certain number of ties of a certain grade that they were going to be taken up that way. If he did not believe he was being fairly treated, he would have an appeal to a regional inspector, and an appeal from that inspection to the bureau itself. If you, as a producer, had reason to believe that a competitor of yours was getting too easy an inspection you, in turn, would have an appeal to the bureau.

The net result would be to place cross ties on the same basis as wheat, or corn, or stocks, or Liberty Bonds. There would be a fixed market determined from time to time by supply and demand. There would be no making a contract for a stipulated class of tie and accepting an inferior grade of tie.

THE PRESENT OUTLOOK

At the closing session on Friday afternoon reports were made by a number of the regional vice-presidents regarding the conditions in their respective areas insofar as the production of cross ties was concerned. B. A. Scott, president of the Scott Tie Company, Detroit, stated that the production of cedar, tamarack, and mountain pine ties in Michigan was well up to normal and estimated that 800,000 soft wood ties were still in the hands of the producers unsold. He further estimated that there are several hundred thousand cedar cross ties which are cut and waiting sale in Canada. Practically no hard wood ties are now being produced in Michigan because of the greater returns available from such timber when cut into lumber. The producers in that area are awaiting with interest the result of the strike among the timber men called for May 1.

Howard Andrews, president of the Nashville Tie Company, Nashville, Tenn., stated that the delivery of ties had been held up for a short time prior to the end of government control in anticipation of higher prices. The production of ties during the past winter was better than expected and is now in excess of the supply of cars available to ship them out.

A. R. Fatham, secretary of the Western Tie & Timber Company, St. Louis, stated that the production in the Southwestern region is far below normal.

OFFICERS ELECT

At the concluding session of the convention on Friday afternoon, the following officers were selected for the ensuing year: President, E. M. Blake, Chas. R. McCormick & Company, San Francisco, Cal.; vice-president, Robert E. Lee, Hobart-Lee Tie Company, Springfield, Mo.; secretary, J. J. Schafly, Potosi Tie & Lumber Company, St. Louis, Mo.; treasurer, John H. Johnson, B. Johnson & Son, Richmond, Ind.; regional vice-presidents and board of directors: Eastern regional district No. 1, B. A. Scott, Scott Tie Company, Detroit, Mich.; Eastern regional district No. 2, R. E. Duvall, Duvall & Company, Washington, D. C.; Allegheny regional district, John H. Johnson, B. Johnson & Son, Richmond, Ind.; Pocahontas regional district E, G. Headley, Valley Tie Company, Staunton, Va.; Southern regional district No. 1, Howard Andrews, Nashville Tie Company, Nashville, Tenn.; Southern regional district No. 2, Otis White, White Tie Company, Jackson, Tenn.; Southwestern regional district No. 1, J. W. Fristoe, T. J. Moss Tie Company, St. Louis, Mo.; Southwestern regional district No. 2, R. E. McKee, Long-Bell Lumber Company, Kansas City, Mo.; Central Western regional district, R. J. Witherell, L. D. Leach & Company, Chicago; Northwestern regional district No. 1, Benjamin Finch, Finch Brothers, Duluth, Minn.; Northwestern regional district No. 2, J. W. Shaw, Eureka Cedar Lumber & Shingle Company, Hoquiam, Wash. San Francisco, Cal., was selected as the location for the next annual meeting.

SERVICE RESULTS WITH TITANIUM-TREATED RAIL

PRIOR TO 1915 The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., issued a series of rail report bulletins covering a very considerable amount of work done to demonstrate the improvement effected in rail steel by treatment with ferro carbon-titanium. Engineers generally were favorably impressed with this work but very naturally questioned whether the demonstrated reduction of segregation and the greater cleanness in the treated steel would cause any material decrease of failures in service.

FAILURES OF BESSEMER RAIL STEEL FOR 1913 AND 1914 ROLLINGS, AS REPORTED IN A. R. E. A. BULLETIN NO. 81 OF THE RAIL COMMITTEE FOR THE PERIOD ENDING OCTOBER 31, 1918

	Mileage Reported Laid In		Failures Per 100 Track Miles		Average Failures Per Year in Service Per 100 Track Miles
	1913	1914	1913	1914	
Titanium-Treated	94.59	31.91	51.8	0.0	5.2
Maryland—Untreated	443.51	91.87	69.9	77.3	16.6
Lackawanna—Untreated	94.05	62.08	77.6	85.3	18.4
Illinois—Untreated	197.28	87.37	98.3	86.9	20.6
Carnegie—Untreated	228.64	77.74	151.3	57.9	22.3
Cambria—Untreated	60.44	11.56	243.2	129.7	40.5
Algoma—Untreated	7.96	66.78	1181.0	324.9	158.6
In Service			5 Years	4 Years	

Mileage of Titanium-Treated Bessemer was rolled as follows:
1913—Lackawanna...37.43 Illinois..57.16
1914—Lackawanna...23.47 Illinois.. 8.44

The data which follows has been compiled from American Railway Engineering Association Bulletin No. 81 of the Rail committee, covering all years from 1913 to 1918, inclusive, in which any titanium-treated rails were rolled for roads reporting to the association. In considering these results it will be interesting to recall the statement of W. M. Wickhorst, engineer of tests of the Rail committee, in a paper read before the American

SCHEDULE OF MAXIMUM AND MINIMUM FAILURES PER YEAR FOR 100 TRACK MILES FOR ANY ONE YEAR

TYPE OF RAIL	Open Hearth		Bessemer	
	Maximum	Minimum	Maximum	Minimum
Titanium-Treated	9.9	0.0	10.4	0.0
Carnegie—Untreated	16.1	6.3	30.2	14.4
Colorado—Untreated	16.4	5.0	.....	.....
Tennessee—Untreated	18.5	10.1	.....	.....
Pennsylvania—Untreated	23.0	9.3	.....	.....
Bethlehem—Untreated	21.2	5.4	.....	.....
Lackawanna—Untreated	23.0	12.3	21.3	15.5
Algoma—Untreated	21.0	7.6	236.2	81.2
Cambria—Untreated	24.0	11.3	46.8	32.4
Illinois—Untreated	20.9	13.6	21.7	19.6
Maryland—Untreated	31.9	9.0	19.3	13.9

FAILURES OF OPEN HEARTH RAIL STEEL AS REPORTED IN A. R. E. A. BULLETIN NO. 81 OF THE RAIL COMMITTEE FOR THE PERIOD ENDING OCTOBER 31, 1918

	Mileage Reported Laid In				Failures Per 100 Track Miles				Average Failures Per Year in Service Per 100 Track Miles
	1913	1914	1915	1916	1913	1914	1915	1916	
Titanium—Treated Rail	101.14	33.32	12.66	10.21	49.5	30.0	0.0	19.6	6.8
Carnegie—Untreated Rail	761.33	487.40	722.03	873.59	82.2	25.4	16.9	13.2	8.7
Colorado—Untreated Rail	1205.68	1047.82	1030.66	1172.01	82.1	27.3	15.1	15.7	9.0
Tennessee—Untreated Rail	1788.25	1848.70	1005.90	1197.84	57.3	44.2	30.5	37.1	12.7
Pennsylvania—Untreated Rail	617.63	271.13	161.30	47.75	71.2	38.0	27.9	46.1	14.0
Bethlehem—Untreated Rail	981.95	558.68	534.25	515.07	97.3	21.6	41.0	42.5	15.0
Algoma—Untreated Rail	.....	76.62	374.74	221.08	.....	67.9	22.9	42.1	15.2
Lackawanna—Untreated Rail	1379.17	746.61	732.50	942.87	115.3	51.0	38.8	25.5	15.3
Cambria—Untreated Rail	408.69	300.34	255.68	194.70	120.1	64.3	34.1	26.1	16.3
Illinois—Untreated Rail	3002.97	1472.04	1890.44	2476.75	96.2	83.4	40.9	26.0	16.5
Maryland—Untreated Rail	410.29	480.30	291.28	365.74	159.7	36.2	99.6	61.8	26.2
					5 Years	4 Years	3 Years	2 Years	

1913 Mileage of Titanium-Treated Rail was rolled as follows: Bethlehem....13.21 Carnegie...23.23 Illinois..64.70
1914 Mileage of Titanium-Treated Rail was rolled as follows: Lackawanna..26.28 Illinois.... 7.04
1915 Mileage of Titanium-Treated Rail was rolled as follows: All at Lackawanna.
1916 Mileage of Titanium-Treated Rail was rolled as follows: All at Cambria.

Society for Testing Materials in June, 1913, which follows:

"The conclusion seems to be, however, that for rails a well-deoxidized, quiet-setting steel must be used in order to avoid excessive segregation and to obtain rail with a uniform hardness at the wearing surface in the several rails of an ingot. *A solution of the ingot problem means the prevention of about half of the failed rails of the country.*"

The average failures per year in service per 100 miles of track for all untreated open hearth rails covered in these schedules were 14.3, while those for titanium-treated open hearth were 6.8. For bessemer rail the average failures per year in service per 100 miles of track were 24.6 for the untreated steel and 5.2 for titanium-treated.

These results indicate clearly that a solution of the ingot problem referred to by Mr. Wickhorst has been found in the use of ferro carbon-titanium to deoxidize and cleanse the steel, as the failures for the titanium-treated open hearth steel in service have been 48 per cent of the average for untreated open hearth and those for the titanium-treated bessemer show only 21 per cent of those for untreated bessemer, this latter very low figure being due to excessively high failures for untreated bessemer rail from one plant.

PICTURES AS AN AID IN RECLAMATION WORK

THE MAINTENANCE of way department of the Pennsylvania Railroad has given the matter of reclamation of track materials a great deal of study in recent years. The general plan under which the department carries out this work, and the details of the practices followed, together with cost data and the results obtained, were outlined on page 239 of the *Railway Maintenance Engineer* for July, 1919. As this work progressed, it was found desirable that the men on the sections have brought home to them the importance of their part in the program. This has been done by means of a bulletin sent to all track foremen and a poster which illustrates various track devices arranged in groups. Group 1 shows materials fit for reclamation, and Group 2 the same materials in condition only for scrap. The bulletin and the poster are reproduced here.

BULLETIN TO ALL TRACK FOREMEN

As the work of reclamation of material has become more and more general, it has been found desirable to start the sorting of maintenance of way scrap at its originating point, which, of course, is where it is removed from track. The purpose of this is two-fold, viz.: To eliminate the shipment of good material to a reclamation plant and back again to the track foremen, and to facilitate the handling of the material as it enters the reclamation plant.

In order to accomplish this, the accompanying poster has been issued and posted in all foremen's tool houses, so that the grouping of reclaimable and non-reclaimable scrap shall be uniform. Instructions have been issued that in throwing this scrap into scrap boxes it shall be collected in two separate piles, covered by Group 1 and Group 2, and that these piles shall be picked up and loaded separately by the work train.

It was decided that this could best be presented to the men on the ground by pictures showing them the actual material in its various conditions of wear and that these pictures, together with the printed description, shall serve as a guide in the sorting of their scrap. Instances can be cited where material has been reclaimed which should not have been reclaimed; cracked splices have been welded at a cost that exceeds that of a new splice; bolts have been rethreaded in a way that does not make for economy when the subsequent service in track of these bolts is considered; cut and bent spikes have been straightened when they would not stand the blow of the hammer to drive them into a tie; broken parts of switch stands have been welded at a cost that exceeds that of a new part.

These instances go to show that a certain line should be drawn between material that should be scrapped and that which should be reclaimed, and it is for the purpose of impressing this upon the minds of the men responsible for the scrap as it starts on its way to the reclamation plant that the poster was issued.

A drive has been conducted for some months with a view to cleaning up material yards, and foremen have been instructed how to pile their material and how to oil it to prevent rust. Monthly inspections of material yards are being made and a marked improvement has been seen. It is with this thought in mind that the last two pictures on this poster were used.

UNITED STATES RAILROAD ADMINISTRATION
DIRECTOR GENERAL OF RAILROADS

PENNSYLVANIA RAILROAD, EASTERN LINES

TO ALL TRACK FOREMEN

TO AVOID REHANDLING: M. W. MATERIAL, AFTER REMOVAL FROM TRACKS, MUST BE CLASSIFIED INTO TWO GROUPS, TO BE PLAINLY MARKED AND LOADED SEPARATELY:—DISTINGUISHING BETWEEN MATERIAL THAT CAN BE RECLAIMED FOR FURTHER USE AND THAT WHICH MUST BE SCRAPPED, AS FOLLOWS:—

	GROUP 1 TO BE RECLAIMED	GROUP 2 TO BE SCRAPPED
SWITCH POINTS	Worn and chipped 10 ft. and 18 ft. points that are not broken nor top of point cut down or chipped more than 15 in. back of point. 30 ft. points fit for track without welding. Points with broken foot guards or lugs.	Broken Points. 10 ft. and 18 ft. points chipped or worn more than 15 in. back of point. 30 ft. points that are chipped 8 inches or more. All worn switch points of less than 85 lbs. section unless ordered held for special work.
GUARD RAIL FASTENINGS	Parts not broken.	Broken parts or parts for rail less than 85 lbs., unless ordered held for special work.
SWITCH AND GUARD RAIL PLATES	Switch plates, guard rail plates, and bridle plates not broken, and over ¼ in. in thickness.	Broken switch plates, guard rail plates, and bridle plates; or less than ¼ in. in thickness. Switch and guard rail fittings for less than 85 lb. rail unless ordered held for special work.
SPLICES	Not broken or cracked.	Broken or cracked.
TIE PLATES	Over ¼ in. in thickness and not broken or cracked.	All broken or cracked or less than ¼ in. in thickness.
SWITCH STANDS	Parts not broken.	Broken parts.
BOLTS	Bolts with slightly worn threads and not worn in the shank over ⅛ in. Whole Nuts.	Bolts with the threads worn to the extent that two or more threads are run together into a flat surface. Bolts worn into the shank to extent of over ⅛ in.
SPIKES	Straight or bent spikes not having cut throat of ⅛ in.	Spikes broken or cut throat ⅛ in. or more.
FROGS	Worn spring, stiff and sliding frogs. H. C. frogs worn less than ⅛ in. Frogs with broken wing rails or springs or spring boxes. Frogs with missing plates.	H. C. Frogs worn ⅛ in. or more at the point. All worn out frogs of less than 85 lb. section unless ordered held for special work.
INSULATED JOINTS	Parts not broken.	Broken parts.
RAIL ANCHORS	Whole parts.	Broken parts.
GUARD RAILS	Wear not to exceed ⅛ in. on side of head.	Broken or worn ⅛ in. or more on side of head.
	Does your material yard look like this?	Or like this?

Poster Used to Demonstrate the Difference Between Usable and Non-Usable Scrap

RAILROADS ENTERING RECONSTRUCTION STAGE

Claims for Deferred Maintenance, Deficiency Appropriations and Hearings on Rate Increases Receiving Attention

Washington, D. C.

WALKER D. HINES, director general of railroads, has resigned and his resignation has been accepted by President Wilson, effective May 15. A large amount of work still remains to be completed in liquidating the affairs of the Railroad Administration and a successor will undoubtedly be named, Max Thelen, director of the Division of Liquidation Claims, being the most likely choice. While Mr. Hines' letter of resignation was not made public, it is known that he has desired to return to the practice of law in New York City.

Activities in Washington affecting the railroads during the past two months have consisted principally of an effort to get adjusted to the terms of the new transportation act under which the roads were returned to private management on March 1. The Interstate Commerce Commission has been somewhat handicapped in preparing to undertake its new functions by the President's delay in appointing the three additional commissioners, because the commission is planning somewhat of a reorganization and the new members are needed in creating new divisions of the commission. The commission has already begun to strengthen its subordinate organization and has established a new Traffic Bureau, with W. V. Hardie as director, and proposes to establish a new Service Bureau, under the direction of F. G. Robbins, and also a Bureau of Capital Issues.

The commission has made a start on the work of readjusting rates to meet the 5½ or 6 per cent return provided by the transportation act and a three-day hearing was held, beginning on March 22, for the purpose of getting the views of all concerned on the division of the railroads into territorial groups for rate-making purposes and also as to what basis should be used for the purpose of determining a temporary or "summary" valuation of the properties as a whole or by groups for rate-making purposes. Representatives of the railroads advocated the use of the property investment accounts as a conservative minimum basis of value but asked that the commission take into consideration any other data in its possession on which it felt it could confidently rely. Little objection to such a general plan was made by the shippers' representatives, but the National Association of Railway and Utilities Commissioners severely criticized the book accounts and asked the commission to build up a valuation from the incomplete data gathered by the Bureau of Valuation.

Since the hearing the commission has been giving serious consideration to the entire subject and has held informal conferences with representatives of the railroads, who have sent questionnaires to all roads for data that will assist the commission both on the question of value and on the question of probable expenses for this year for the purpose of ascertaining how much of an increase in revenues will be necessary. Most of those who appeared at the hearing were in favor of dividing the roads into three groups, eastern, western and southern, which would require different percentages of increase than if all roads were considered as a whole.

While it has been generally estimated that the railroads would need something like a 25 per cent increase in freight rates to restore the relation between expenses and earnings which has been so disturbed during federal control, largely by increases in wages, and to permit of necessary expenditures for maintenance, a new factor has been interjected into the situation by the consideration of demands for general wage increases for all classes of railroad employees, which, if granted in full, would require about another 25 per cent increase in rates. These demands, which have been estimated at about $1,000,000,000 a year, were originally presented to the Railroad Administration, which did not reach a final decision upon them, and after the return of the roads they were taken up by a bi-partisan conference between committees representing the railroads and the principal railroad labor organizations. The railroad committee, however, declined to grant any of the demands on the ground that they involved so great a burden on the cost of transportation that they should be passed upon by some tribunal representing the public interest and they were accordingly laid before the new Railroad Labor Board at its first meeting after its appointment and public hearings were begun before the board on April 19.

This proceeding raises an interesting question as to whether the Interstate Commerce Commission will be able to work out the new rates that are necessary to pay the wages already allowed during the past few years before the labor board raises them again, because, under the law, any substantial increase in wages would require another advance in rates.

The extent of the readjustment now necessary is indicated by the fact that in February, the last month of government operation of the railroads, the roads not only failed to earn a dollar of the government guaranty, but had an operating deficit of $12,000,000, in spite of the fact that the volume of freight traffic was 27 per cent greater than for February, 1919, and greater than for any February during the last four years.

New Appropriation

Director General Hines on April 2 asked Congress for an additional appropriation of $420,000,000 to enable the Railroad Administration to settle its accounts up to March 1. This would make the total of appropriations for the Railroad Administration $1,870,000,000, of which $904,000,000 would represent the government's loss from the operation of railroads and other transportation systems and $966,000,000 would represent investments or advances to the carriers which are to be paid back gradually. The House, however, reduced the appropriation to $300,000,000 and the Senate committee reported the bill on April 22 with the reduced figure. The reduction was made by a provision requiring the War Finance Corporation to take over at par some $90,000,000 of Liberty bonds left on the hands of the Railroad Administration by employees who had subscribed for them and by omitting about $30,000,000 for claims which the committee thought could be taken care of out of the $300,000,000 revolving fund provided by the transportation act.

In submitting his estimate of the appropriation Mr. Hines said:

"In connection with the foregoing estimate of the amount of the appropriation required to liquidate the affairs of the Railroad Administration, no allowance has been made for the settlement of claims on the part of the corporations for undermaintenance of their prop-

erty during the period of federal control. While there may be such claims on the part of some corporations, there will be, on the other hand, claims by the government against other corporations for maintenance of the property in excess of the contract requirements, which may require the payment of sums by the corporations to the government. In the absence of final figures, it seems best not to make any estimate of the net amount required to settle such maintenance claims."

Thus far the only large road that has filed its claim for undermaintenance is the Seaboard Air Line, and the amount of its claim has not been made public. The Railroad Administration has not yet stated its claims against the companies for maintenance in excess of its contract obligation, but it is withholding sums from its payments to the companies on account of their rental for the period of federal control to cover the amount of such possible claims for overmaintenance. The railroads that think they have something coming to them for deferred maintenance are not in such a fortunate position as to be able to retain control of the amount in dispute.

Mr. Hines also discussed the maintenance question in his testimony before the Appropriations Committee, saying in part:

"These returns necessarily are not yet in for the entire period, and pending their receipt and analysis, it will be impracticable to form a reliable judgment. We have had various tentative figures which were made by the regional directors during the period of federal control, but they would necessarily have to be reviewed in the light of the more accurate accounting returns. On the whole, my judgment has been and is that the government is not warranted in assuming that there will be any net amount due by it to the railroad companies for undermaintenance. No doubt some particular company may be able to claim, with great plausibility, that as to some particular branch of its property more maintenance ought to have been applied, but I believe thesec laims will be largely dispelled by viewing the situation of each company as a whole; and even if in some cases a particular company should be able to sustain a claim for a net amount there is the probability that the government would be able to sustain a claim of equal amount against some other company for overmaintenance. Viewing this entire situation, it has seemed to me there was no basis at present for the assumption that any additional amounts would have to be appropriated to take care of any possible balance of claims for undermaintenance in excess of claims the government may maintain for overmaintenance. The matter is necessarily of a controversial nature, and it would clearly be inexpedient for the government to undertake in advance of getting all the facts to commit itself either as to any particular company or as to companies generally, because such commitment, if favorable to the government, would not be allowed to operate in its favor; and if unfavorable to the government, might be seized upon and used to the government's detriment."

Max Thelen, director of the Division of Liquidation Claims, also discussed the maintenance question, saying in part: "The uncertainty as to the amount of those claims and also the very large amount of money that can be saved by careful and efficient management as against that which would be lost otherwise is, I think, well illustrated by the first claim that has come in. We have now before us the claim of one of the largest railroads, which claim is for some $3,000,000 of alleged undermaintenance of equipment, some $2,000,000 for alleged undermaintenance of way and structures, and a little less than $1,000,000 for alleged failure to turn back materials and supplies in the quantity and the quality we should have turned back, making a total of $6,000,000 of claims against the government presented by this one railroad. On the other hand, our own tentative figures would seem to indicate an overmaintenance of equipment running somewhere between two and three million dollars, as contrasted with their claim of undermaintenance amounting to $3,000,000. There is a difference there of almost five or six million dollars in the respective claims of the company and of the government on that one item. As far as maintenance of way and structures is concerned, our figures show a very much less amount than what they claim."

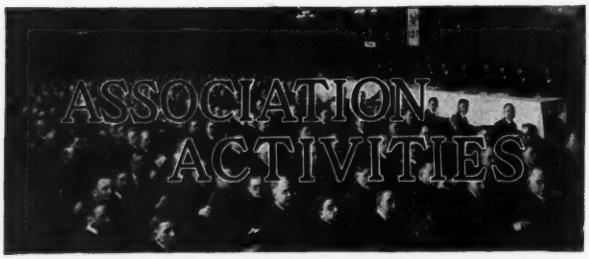
UNAUTHORIZED STRIKE INTERFERES WITH TRAFFIC

COMMENCING with a strike of switchmen at Chicago on Easter Sunday, a series of unauthorized spontaneous strikes have taken place in railway terminals all over the country, seriously interfering with transportation and tying up industrial and commercial operations to no small extent. At Chicago, the conditions at the time that the strike was started were greatly aggravated because of a most unusual blizzard which raged all day Sunday in the middle west with an unprecedented fall of snow for that season of the year.

While the strikers throughout the country have consisted primarily of switchmen and engine crews in switching service, in the East, notably in the vicinity of New York City, a great many road crews including those in passenger and suburban service also took part in the strike. At Chicago the strike was called by John Grunau, organizer and president of the Chicago Yardmens' Association, an organization that has received no recognition by the American Federation of Labor or the brotherhoods officially representing the organized railway men in their dealings with the United States Railroad Administration. The immediate cause of the strike was said to arise as a consequence of the dismissal of Mr. Grunau from his position in yard service of the Chicago, Milwaukee & St. Paul. Following the calling of the strike, the union drew up a list of demands which it declared must be granted immediately.

Leaders and members of the recognized railway brotherhoods have denounced the strike repeatedly and in no uncertain terms and have joined the forces of the railroads and the government in efforts to induce the men to return to work. During the progress of the strike, switching and engine crews have been recruited from employees in other branches of service, railway officers and members of the loyal unions. While the reduction in service has affected industries in the large rail centers, in some instances going so far as to throw the workmen out of employment temporarily, the supplies of food in large centers of population have not been seriously affected

About the middle of the month the government took an active part through the agency of the Department of Justice. John Grunau and other leaders of the Chicago Yardmens' Association were arrested charged with violation of the sections of the Lever act making it unlawful to conspire, combine, agree or arrange with any other person to limit facilities for transporting, supplying or dealing in the necessities of life. By making it definitely understood that any one who endeavored to take the place of the union leaders who had been arrested and who in any way would attempt to further or project the strike would be arrested as fast as any overt acts were established, strikers found themselves virtually without any active leadership.



The associations of the maintenance of way field are prosecuting their work actively, although relatively little other than progress can be reported at the present time.

THE AMERICAN RAILWAY ENGINEERING ASSOCIATION

Following action by the Board of Direction about the time of the convention, the American Railway Engineering Association has become the sixth member of Engineering Council and H. R. Safford, president of the American Railway Engineering Association, has been named as its representative. With the addition of the 1,650 members of the A. R. E. A., Engineering Council now represents an aggregate membership of 45,000.

The secretary has just issued notices to prospective members of the various committees requesting them to state whether or not they will accept the appointments. One new committee has been added to the list to cover the subject of Shops and Engine Terminals. With 18 to 20 members on this committee and 30 additional members on the old committees, 50 more members will serve on committees than in any previous year.

BRIDGE AND BUILDING ASSOCIATION

The annual proceedings containing the report of last October's convention, held at Cleveland, have been published and are now being distributed to the members.

AMERICAN WOOD PRESERVERS' ASSOCIATION

The Committee on Promotion and Education met in Chicago on April 21, 22 and 23 and perfected an extensive campaign for the co-ordination of the various commercial wood preserving interests of the country into a campaign for the promotion of the use of treated timber for those purposes for which it is adapted.

MAINTENANCE OF WAY CONVENTIONS

American Railway Bridge and Building Association, C. A. Lichty, secretary, C. & N. W., Chicago. Next annual convention, Atlanta, Ga., October 26-28, 1920.

American Railway Engineering Association, E. H. Fritch, secretary, 431 South Dearborn street, Chicago. Next annual convention, Congress Hotel, Chicago, March 15-17, 1921.

American Wood Preservers' Association, F. J. Angier, secretary, Mount Royal Station, Baltimore, Md. Next annual convention, San Francisco, Cal., January 25-27, 1921.

Maintenance of Way Master Painters' Association of the United States and Canada, E. E. Martin, secretary, Room 19, Union Pacific Building, Kansas City, Mo. Next annual convention, Detroit, Mich., October 5-7, 1920.

Roadmasters' and Maintenance of Way Association of America, P. J. McAndrews, secretary, C. & N. W., Sterling, Ill. Next annual convention, St. Louis, Mo., September 21-23, 1920.

THE MATERIAL MARKET

AFTER HAVING practically recovered from the disastrous effects of the steel and coal strikes, the iron and steel industry is again suffering a serious setback through the switchmen's strike. This condition, of course, will delay that much longer the prospects of any restoration of normal conditions in the steel market. Another factor to be considered is that the export business has continued larger than would ordinarily be assumed. As a result the prices are still on an upward trend. Track spikes have sold as high as $4.25 and track bolts at $6 per 100 lb. But little publicity is being given just now on orders for rails and track fastenings, although it is understood that a considerable tonnage is being placed and some of it at appreciable advances in prices, some 200,000 tons of rails being sold at $57. The price of cast iron pipe has again advanced, being now quoted at $77.80 for six-inch or larger. Wire and wire products continue scarce and are either out of the market or are quoted at steadily increasing prices.

With the falling off of building programs which has had a pronounced influence on the lumber market, there has been a reduction in the demand for structural steel, although the present condition of production is such as to offset any tendency which reduced demand would have to reduce the price.

	Prices in cents per pound			
	March 20		April 20	
	Pittsburgh	Chicago	Pittsburgh	Chicago
Track spikes	4.00	3.62 to 3.87	3.55 to 4.25	3.82 to 4.52
Track bolts	6.00	5.17 to 5.27	4.90 to 6.00	5.17 to 6.27
Boat spikes	4.25	4.52	4.25	4.52
Angle bars	2.57	2.75	2.75	2.75
Tie plates, steel	2.75	2.75		
Tie plates, iron	3.00 to 4.00	3.75	3.00 to 4.00	3.75
Plain wire	3.00 to 3.50	3.27 to 3.77	3.00 to 3.50	3.27 to 3.77
Wire nails	3.25 to 4.00	3.52 to 4.27	3.25 to 4.00	3.52 to 4.27
Barbed wire, galvanized	4.10 to 4.45	4.27 to 4.72	4.10 to 4.45	4.37 to 4.72
C. I. pipe, 6-in. or larger (per ton)		72.80		77.80
Plates	2.65 to 4.00	2.92 to 4.27	2.65 to 4.00	2.92 to 4.27
Shapes	2.45 to 4.00	2.27 to 4.27	2.45 to 4.00	2.72 to 4.27
Bars (steel)	2.35 to 4.00	2.62 to 4.52	2.35 to 4.50	2.62 to 4.77
Rivets	4.50	4.77	5.37	5.62

The scrap market shows practically no change from last month as indicated by the table below:

	Per Gross Ton	
	Chicago	St. Louis
Relaying rails	$40.00 to $50.00	$50.00 to $55.00
Rerolling rails	32.50 to 33.50	32.50 to 33.00
Rails less than 3 ft. long	29.00 to 29.50	28.00 to 28.50
Frogs and switches, cut apart	23.50 to 24.00	24.50 to 25.00
	Per Net Ton	
No. 1 railroad wrought	27.00 to 27.50	25.50 to 26.00
Steel angle bars	24.00 to 24.50	24.00 to 24.50

The indications of a weakening tendency in the prices of lumber as reported last month have proven correct as there have been reductions from $2 to $10 per thousand on a great many items, although a few still are maintained at the prices of a month ago. With the marked reduction in the demand for lumber by the small builders, the lumber dealers have turned increased attention to the railroads. The tie market is active. The Douglas Fir Exportation & Export Company has closed a contract for the export of 21,000,000 ft. b.m. of ties (about 600,000) for European consumption.

DATA ON UNDERMAINTENANCE

AN EXAMPLE OF the extent of the undermaintenance of the roads during the government control period is obtained from the following data taken from the annual report of the Chicago, Rock Island & Pacific for the fiscal year ending December 31, 1919, which has just been issued:

	Average per year during 3-year test period ended June 30, 1917	Average during 1918 and 1919
1. Cross ties used in maintenance	2,412,761	1,612,098
2. Switch ties used in maintenance (feet b.m)	4,627,636	3,275,437
3. Miles of new steel rail laid in main tracks, main and branch lines	198.69	111.91
4. Miles of second-hand relay steel laid in main tracks, main and branch lines	54.16	68.42
5. Ballast (cu. yd.) used in repairs to ballast	502,651	375,748
6. Pile trestle bridges built in renewal (lineal feet)	24,984	9,422

GENERAL NEWS DEPARTMENT

The United States Forest Products Laboratory, Madison, Wis., has made arrangements to install a screw power testing machine of 1,000,000-lb. capacity. It will be designed to conduct tests in tension, compression and bending.

The new headhouse of the St. Paul (Minn.) Union Station was opened for business on Sunday, April 4 . This structure, costing $1,500,000, is a part of the extensive general terminal improvement in St. Paul, to be completed in 1923, at a cost of more than $14,000,000.

Exports of rails in February, 1920, totaled 31,241 tons, valued at $1,724,970; of spikes, 2,787,036 lb., valued at $117,130, and of switches, frogs, splice bars, etc., to the value of $411,538, according to detailed figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce.

A New York court holds that the failure of a railroad company to comply with the requirement of the New York railroad law, to fence its road to prevent livestock going thereon is evidence of negligence in favor of one suing for the death of a child struck by a train on an unfenced track onto which he had strayed.

The Chicago, Milwaukee & St. Paul and the Chicago, Burlington & Quincy, which occupy opposite sides of the upper Mississippi river, have been experiencing no little difficulty during the past month in maintaining traffic as a consequence of extremely high water in the Mississippi river, the stage being the highest since 1880.

In a report issued on April 15 by Frederick H. Lee, secretary of the Presidents' Conference Committee on Federal Valuation, the statement is made that although no tentative valuations have been served by the Interstate Commerce Commission since November 8, 151 preliminary engineering, 167 land and 53 accounting reports have been tendered to the carriers for examination.

The most recent innovation in car construction is a steel hopper car build by the Canadian Pacific for grain traffic. The general design is practically the same as that commonly used for coal cars except that this car is built with a steel roof provided with hatch openings on each side for filling the car with grain. This car has been placed in regular service between Port McNicoll, Ont., and West St. John.

The Minister of Railways of Canada, reporting to the House of Commons at Ottawa, recently, presented statements showing that the Canadian National Railways in the fiscal year ending March 31 had fallen short of paying expenses by about $14,000,000. That part of the government system represented by the Canadian Northern Lines lost $6,500,000, and the lines owned by the government $7,500,000. In addition to this operating loss, fixed charges for the year, amounting to $19,000,000 must be absorbed by the government.

As a Result of Their Accident Prevention Work during the calendar year of 1919, the railroads of the United States saved at least $4,000,000. This estimate, which was compiled by the National Safety Council, is based on the records of the Safety Section of the Untied States Railroad Administration, and shows that during the first 11 months of 1919 there were 27,933 fewer injuries and 2,103 fewer deaths than occurred during the first 11 months of the preceding year. The total reduction in the railroad accident casualty list was 30,036.

The Employees' Mutual Relief Association of the Long Island Railroad, which was organized in 1886, now has a membership of more than 8,000, which is greater than the number of persons employed by the railroad. The reason for this is that employees who have left the service of the road can retain their memberships, when desired, by the payment of regular dues. At present there are 1,500 members who are out of the service. During the 34 years of its existence, this association has disbursed approximately $1,500,000 to members and their families or dependents, and in 1919 benefits amounting to $83,370 were paid to 1,150 members and to the families of 89 members who died from natural illness or accidents.

The Norfolk & Western was the victim of a strike of approximately 12,000 clerks and shopmen during the early part of April. The only tangible reason for the strike that was made public was a demand for the dismissal of two non-union clerks, whose offense is not clearly explained. The railroad agreed to transfer the clerks to another department, while the leaders of the strikers agreed that in the future organized employees on the road will not walk out without submitting to a thorough investigation of their grievances. Other important concessions were also said to have been made by both sides.

The tenth anniversary of the opening of the Forests Products' Laboratory at Madison, Wis., will be celebrated during the latter part of June. Present plans call for a two-day meeting with addresses by men of national reputation in science and industry. This laboratory, which is a branch of the United States Forest Service, was established in 1910 in co-operation with the University of Wisconsin, and is a consolidation of a number of testing laboratories and other units which had been located at various points throughout the country. The laboratory occupies five buildings in whole or in part and employs about 200 people.

The Railway Business Association held its annual meeting and banquet at the Waldorf-Astoria Hotel, New York City, on Wednesday, March 31. Alba B. Johnson, president of the association, presided at the banquet which was attended by some 1,500 members and their guests, who included a large portion of the leaders of the railway and railway supply fields. The speakers included Frederick J. Koster, of San Francisco, president of the California Barrel Company, who spoke on "American Destiny"; George W. Simmons, vice-president of the Simmons Hardware Company, St. Louis, who spoke on the subject of "A Continent Marking Time," and Joseph S. Frelinghuysen, United States Senator from New Jersey, who had for his subject "Partners in Prosperity."

To determine the attitude of the United States Chamber of Commerce towards the establishment of a Department of Public Works by the federal government, this question has been submitted for a referendum vote to the 1,305 member organizations. Engineering Council, the organization which suggested the desirability of a federal Department of Public Works, believes that there is an urgent need in the national government for such a department to carry on the work of an engineering and construction character and has gone on record as favoring the adoption of the Jones-Reavis bill, now pending in Congress. Among other things, this bill would place all engineering work under the Interior Department under the new name Department of Public Works and transfer the non-engineering work now transacted by bureaus under the Department of the Interior to other departments.

The American Association of Engineers has prepared a tentative program for its fifth annual convention, to be held at the Planters' Hotel, St. Louis, Mo., on May 10 and 11. Among the subjects which will be discussed are the following: Shall a special charge for special service be made by the employment department; a permanent home for A.A.E.; what part shall A.A.E. take in the presidential campaign; Americanization and man power engineering; the federal department of A.A.E. at Washington; opportunities for the engineer in civil, structural, mechanical, mining and chemical fields; unity of the engineering profession in the United States. In addition to these subjects, group meetings will be held, one of which, a meeting for railroad engineers, will be held at 8.00 p. m., on the first day of the convention.

PERSONAL MENTION

GENERAL

J. H. Redding, division engineer on the Pennsylvania Railroad, with headquarters at Jersey City, N. J., has been promoted to assistant superintendent of the Pittsburgh division, with headquarters at Cresson, Pa.

M. J. Wise has been appointed manager of the department of materials and supplies, Division of Liquidation Claims, of the United States Railroad Administration, with office at Washington. **J. H. Lauderdale** has been appointed assistant manager, and **H. R. Condon** and **J. A. Turner,** assistants to the manager.

A. E. Triplett, division engineer on the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., has been promoted to division superintendent on the St. Louis Southwestern of Texas, with headquarters at Mt. Pleasant, Tex., succeeding H. H. Hooper. Mr. Triplett served as division engineer on the St. Louis Southwestern for only one month, having been appointed to that position on March 1. Previous to his connection with the St. Louis Southwestern he was engineer maintenance of way on the Missouri, Kansas & Texas of Texas, at Denison, Tex.

W. A. Baldwin, general manager of the Erie, with headquarters at New York, has been appointed manager of the Ohio region, with headquarters at Youngstown, Ohio, under the road's new plan of organization. Mr. Baldwin was born on July 26, 1876, at Elmira, N. Y., and graduated from Cornell University in 1896. He entered railway service the same year as a chainman on the Erie and in May, 1899, he was promoted to rodman and some time later to assistant engineer. From March, 1902, until September, 1903, he acted as trainmaster. He was then appointed division engineer and retained that position until 1909, from which time until December, 1910, he served again as trainmaster. He was promoted to superintendent of the Chicago and Lima divisions in 1910 and was transferred to the Jefferson and Delaware divisions in May, 1912. Afterwards he was promoted to general superintendent of the Lines East of Salamanca and in 1917 was transferred to the Lines West, with headquarters at Youngstown. He was appointed transportation assistant with jurisdiction over transportation matters formerly in charge of the general manager in June, 1918, and a month later was appointed general manager.

W. A. Baldwin

John Benjamin Russell, real estate engineer on the Boston & Maine, has been appointed supervisor of contracts, with office at Boston, Mass. Mr. Russell was born at Walpole, N. H., on January 1, 1869. He graduated from Dartmouth College in 1893, and began railway engineering work with the James F. McDonald Company in January, 1898, on the construction of the Washington County Railroad of Maine, now a part of the Maine Central System. From February to April, 1899, he was employed by the Boston & Albany on the design of a locomotive coaling plant at Beacon yard, Allston, Mass., returning to the McDonald company as chief draftsman and later as principal assistant engineer in charge of the construction of the Richmond, Petersburg & Carolina Railroad, now a part of the Seaboard Air Line. In 1900 he again entered the employ of the Boston & Albany and was engaged on miscellaneous design and construction work. In July, 1908, he was appointed resident engineer in charge of the reconstruction of the Grand Junction Terminal, which had been destroyed by fire, and in September, 1909, he assumed the duties of the principal assistant engineer in addition to those of resident engineer, being appointed engineer of construction on the Boston Division, upon the creation of that position, in January, 1910. In January, 1912, he resigned to become first assistant engineer with the directors of the Port of Boston, later being appointed principal assistant engineer and in October, 1913, was assigned the duty of organizing the operating corps and superintending the operation of Commonwealth pier No. 5. In February, 1914, he re-entered the employ of the Boston & Maine in the valuation department. On November 1, 1917, he was appointed real estate engineer and on March 20, 1920, was appointed supervisor of contracts in the office of the clerk of the corporation, as noted above.

Noel W. Smith, general superintendent of the Eastern Pennsylvania division of the Pennsylvania Railroad, with headquarters at Altoona, Pa., and for many years in the maintenance of way department, has been promoted to assistant general manager of the Central Region, with headquarters at Pittsburgh, Pa. Mr. Smith was born at Williamsport, Pa., on December 25, 1869. He first entered the service of the Pennsylvania Railroad as a student in telegraphy in the ticket office at Williamsport. He was employed later as a clerk in the division freight agent's office at Williamsport on July 1, 1887, where he worked until September 12, 1889, when he entered Lehigh University. After graduating from that college Mr. Smith re-entered the service of the Pennsylvania Railroad as a rodman on the Sunbury division on April 24, 1893. He served as assistant supervisor on the Baltimore, Renovo, Williamsport, Erie and Maryland divisions and on experimental track work for the chief engineer of maintenance of way at Harrisburg, Pa. On January 1, 1900, he was promoted to supervisor at Williamsport and later was transferred to Middletown and to Harrisburg. On December 15, 1905, he was transferred to the office of the principal assistant engineer at Altoona, and on May 1, 1906, was promoted to assistant to the principal assistant engineer at Altoona. On April 1, 1907, Mr. Smith was promoted to division engineer of the Middle division, and on January 15, 1910, he was promoted to superintendent of the Central division. On June 16, 1913, he was transferred to the Middle division at Altoona, Pa., and on July 1, 1918, he was promoted to general superintendent of the Eastern Pennsylvania division, with the same headquarters, remaining in this position until his recent promotion, as noted above.

Noel W. Smith

Joseph H. Redding, division engineer on the Pennsylvania Railroad, with headquarters at Jersey City, N. J., has been promoted to assistant superintendent of the Pittsburgh division of the Central Region, with headquarters at Cresson, Pa. Mr. Redding was born in Philadelphia, Pa., on November 26, 1877, and entered the employ of the Pennsylvania Railroad in 1897 as a draftsman in the office of the engineer of maintenance of way. In April, 1905, he was promoted to transitman, and two months later to assistant supervisor. The following year he was transferred to the Maryland division and in 1907 was promoted to supervisor on the Sunbury division, being transferred in 1909 to the Monongahela division, and in December, 1913, to the Baltimore division. In May, 1916, he was appointed supervisor of the Camden Terminal division and the West Jersey & Seashore, with headquarters at Camden, N. J. In June of the following

year he was transferred to the Philadelphia division at Paoli, Pa., and in October of that year was promoted to division engineer of the West Jersey & Seashore at Camden, N. J., being transferred in September, 1918, to the Middle division at Altoona, Pa., and in November, 1919, to the New York division, with headquarters at Jersey City, N. J., from which position he was appointed assistant superintendent, as noted above.

E. Eugene Adams, consulting engineer of the Union Pacific, with headquarters at New York, has been appointed assistant to the president in charge of purchases, engineering and standards, with headquarters at Omaha, Neb. Mr. Adams was born at Watertown, Mass., on September 12, 1881, and graduated from the University of California in 1904. He entered railway service with the Southern Pacific as assistant engineer and superintendent of pipe lines in August, 1905, later being appointed assistant engineer. Subsequently he became assistant consulting engineer of the Harriman lines under J. D. Isaacs, with headquarters at Chicago and later at New York. In February, 1913, when the Southern Pacific and the Union Pacific were reorganized with separate managements, Mr. Adams was promoted to consulting engineer of the Union Pacific system. On March 1, 1918, he was appointed assistant director of the Division of Capital Expenditures of the United States Railroad Administration, with headquarters at Washington. On January 1, 1920, Mr. Adams returned to the Union Pacific as consulting engineer, which position he retained until his recent appointment.

E. Eugene Adams

George A. Harwood, corporate chief engineer of the New York Central Lines, with headquarters at New York, has been appointed assistant to the president, with the same headquarters. Mr. Harwood was born on August 29, 1875, at Waltham, Mass., and graduated from Tufts College in 1898. He entered railway service in 1893 in the engineering department of the Fitchburg Railroad, now part of the Boston & Maine, and with the exception of the time spent in college he remained with that road until 1900, when he entered the employ of the New York Central. From April, 1900, until November 1, 1906, he held various positions in the engineering departments of that road. He was then appointed chief engineer, electric zone improvements, in charge of the construction of the Grand Central Terminal and general improvements of the electric zone, later handling in addition special work in connection with west side improvements in New York City, and other developments in Buffalo, Cleveland and other places. On July 1, 1916, he became engineering assistant to the vice-president of the New York Central Lines, which position he retained until June 10, 1918, when he was appointed engineering assistant to the federal manager of the New York Central. In July, 1918, he was appointed corporate chief engineer of all the roads embraced in the New York Central system, which position he held at the time of his appointment, as noted above.

George A. Harwood

R. S. Belcher, superintendent of the timber treating plant of the Atchison, Topeka & Santa Fe at Somerville, Tex., has been promoted to manager of treating plants for the Santa Fe System, with headquarters at Topeka, Kan., succeeding **George E. Rex,** who has resigned to become vice-president of the National Lumber and Creosoting Company, as noted in last month's issue.

ENGINEERING

J. V. McKeon has been appointed chief engineer of the Detroit & Mackinac, with headquarters at East Tawas, Mich.

H. D. Row has been appointed division engineer of the Cincinnati division of the Erie, with headquarters at Marion, Ohio.

J. F. Schwed, first assistant engineer of the Lake Erie & Western, with headquarters at Indianapolis, Ind., has resigned.

C. R. Stewart has resigned as consulting engineer in the executive department of the Erie to engage in other business.

E. G. Thompson has been appointed assistant engineer on the Louisville & Nashville, with headquarters at Montgomery, Ala., succeeding **J. F. Caldwell.**

K. L. Moriarty, masonry inspector in the bridge department of the Chicago Great Western, has been promoted to assistant engineer, with headquarters at Chicago, succeeding **H. B. Pettit.**

C. J. Parker, principal assistant engineer of the New York Central Lines east of Buffalo, with headquarters at New York, has been appointed chief fire protection engineer for the New York Central System, a newly created position, effective March 1.

H. M. Bassett, corporate engineer of roadway and structures of the New York Central Lines, with headqaurters at New York, has been appointed general office engineer, the corporate position of engineer of roadway and structures having been abolished.

Roy B. Albaugh, who has been appointed division engineer of the St. Louis Southwestern, with headquarters at Tyler, Tex., succeeding **W. T. Eaton,** as noted elsewhere. He was born at Greencastle, Ind., on August 16, 1889. He received his education at Depauw and Purdue universities, entering railway service on June 24, 1911, with the Louisiana & Arkansas as a rodman. From 1911 to 1920 he served successively as rodman, instrumentman, assistant engineer, chief clerk to general manager, assistant superintendent and superintendent, with the exception of two years when he served as captain in the Twelfth Engineers (Lt. Ry.) of the A. E. F.

E. W. Englebright, assistant to E. E. Adams while consulting engineer of the Union Pacific at New York, has been appointed engineer for the executive officers with headquarters at New York. Mr. Englebright entered railway service in the engineering department of the Southern Pacific in 1903, later serving as assistant engineer, roadmaster and assistant division engineer. In 1913 he went to New York as assistant to the consulting engineer of the Union Pacific. During 1918 and 1919, while Mr. Adams was in Washington as engineer of the Division of Capital Expenditures of the Railroad Administration, Mr. Englebright served as acting corporate consulting engineer of the Union Pacific.

W. T. Eaton, division engineer on the St. Louis Southwestern of Texas at Tyler, Tex., has been appointed assistant engineer, with the same headquarters. **R. B. Albaugh** has been appointed division engineer at Tyler, succeeding Mr. Eaton, and also **J. O'Connor,** general roadmaster. **A. W. Foscue,** division engineer at Mt. Pleasant, Tex., has been appointed assistant engineer, with the same headquarters, and is succeeded by **J. F. Montgomery,** who also succeeds **J. C. Webb,** general roadmaster. **J. F. McCurdy,** division engineer at Pine Bluff, Ark., on the St. Louis Southwestern,

has been appointed assistant engineer, with the same headquarters. **W. H. Raleigh,** roadmaster on the Missouri, Kansas & Texas of Texas, at Denison, Tex., has been appointed division engineer on the Cotton Belt, with headquarters at Pine Bluff, succeeding **A. E. Triplett,** promoted to division superintendent, as noted elsewhere, after having served as division engineer from March 1, 1920, when he succeeded Mr. McGurdy, mentioned above, and **C. C. Warren,** general roadmaster at Pine Bluff.

A. L. Curtis, assistant engineer of construction on the New York, New Haven & Hartford, with headquarters at Pawtucket, R. I., has been promoted to district engineer in charge of lines west of New London and Willimantic, with headquarters at New Haven, Conn.

C. W. Simpson, formerly resident engineer in charge of the construction of that portion of the Clark's Summit-Hallstead cut-off of the Delaware, Lackawanna & Western in the vicinity of Nicholson, Pa., including the Tunkhannock viaduct, has been appointed valuation engineer of that road, with headquarters at Hoboken.

A. Harvey, acting district engineer of the St. Louis district of the Missouri, Kansas & Texas, with headquarters at Sedalia, Mo., has been definitely appointed district engineer. **H. T. Hander** has been appointed district engineer at Parsons, Kan. **F. M. Thomson,** district engineer on the Wichita Falls & Northwestern, with headquarters at Wichita Falls, Tex., has been transferred to the Missouri, Kansas & Texas, with headquarters at Muskogee, Okla., succeeding **E. M. Moursand,** promoted to engineer maintenance of way, as noted in last month's issue.

Edgar M. Hastings, resident engineer of the Richmond, Fredericksburg & Potomac, has been promoted to principal assistant engineer, with headquarters at Richmond, Va. Mr. Hastings was born on March 5, 1881, in Maryland and received his education at the Baltimore Polytechnic Institute. He was employed by the Baltimore & Ohio during the summers of 1900 and 1901 and entered the employ of this road permanently in 1902 as chainman and rodman. In 1903 he went to the Richmond, Fredericksburg & Potomac as instrumentman. In 1906, Mr. Hastings was promoted to resident engineer, since which time his duties have increased to cover design and supervision of construction and maintenance.

C. W. Campbell, general foreman maintenance of way on the Wichita Falls & Northwestern, with headquarters at Gainesville, Tex., has been appointed district engineer of the Shreveport district of the Missouri, Kansas & Texas of Texas, with headquarters at Greenville, Tex. **J. C. Hill** has been appointed district engineer of the Texas Central district, with headquarters at Waco, Tex. **A. M. Acheson,** division superintendent at Trinity, Tex., has been given the title of superintendent and district engineer, Trinity district, with the same headquarters. **W. W. Marshall** has been appointed district engineer of the Wichita Falls & Northwestern district, with headquarters at Wichita Falls, Tex., succeeding **F. M. Thomson,** transferred, as noted elsewhere.

Harry G. Lennox, field engineer on valuation on the Chicago & North Western, has been promoted to division engineer on that road, with headquarters at South Pekin, Ill. Mr. Lennox was born at Watertown, N. Y., on September 4, 1882, and entered railway service in 1900 with the Glenfield & Western. He was out of railway service for a couple of years and in 1902 entered the employ of the Missouri Pacific as a chainman. In 1903 he was employed as a levelman on the Western Pacific in Nevada and California, and the following two years served as rodman and instrumentman on the Los Angeles & Salt Lake. In 1905 he entered the service of the Chicago & North Western as a rodman, with which road he has since been employed as instrumentman on maintenance, construction and location and field engineer on valuation, which latter position he held until his recent promotion.

J. F. Montgomery, who has been appointed division engineer of the St. Louis Southwestern of Texas, with headquarters at Mt. Pleasant, Tex., succeeding **A. W. Foscue,** as noted elsewhere, was born at Clinton, Mo., on June 29, 1885. Mr. Montgomery entered railway service in August, 1905, with the Missouri, Kansas & Texas as a rodman, later serving as instrumentman. From 1906 until 1907 he served as instrumentman on location, in the latter year being appointed engineer for the Dallas Street Railway Company, which position he retained until 1908. He returned to the Missouri, Kansas & Texas in 1908, as assistant engineer and served in this capacity until 1912, when he was appointed chief engineer of the Wichita Falls & Northwestern. Mr. Montgomery was appointed division engineer on the Missouri, Kansas & Texas in 1914, which position he held until September, 1919, when he engaged in the contracting business, in which he continued until his appointment as noted above.

Orlando K. Morgan, engineer in charge of the Carolina, Clinchfield & Ohio, with headquarters at Erwin, Tenn., has been promoted to chief engineer. Mr. Morgan was born on January 27, 1870, at Alliance, Ohio, and graduated from the high school at Carrollton, Ohio. He entered railway service in 1888 as a rodman for the Coshocton & Southern, now part of the Wheeling & Lake Erie, later becoming transitman. From 1889 until 1890 he was draftsman for the Wrought Iron Bridge Company in Canton, Ohio. In 1890 he went to the Norfolk & Western as draftsman and assistant engineer, which position he retained until 1893, when he became assistant engineer of the Boston, Revere Beach & Lynn. He went to Brockton, Mass., in 1895 as city draftsman and held that position until 1896, when he was appointed assistant engineer on the Boston & Maine. In 1900 he became engineer for the board of sewer commissioners of Wakefield, Mass. He was appointed assistant engineer of the Massachusetts Electric Railways, with headquarters at Boston, Mass., in 1904 and remained with that company until 1905, when he received an appointment with the Carolina, Clinchfield & Ohio as chief draftsman. He subsequently held the positions of office engineer, engineer maintenance of way and engineer in charge, respectively, retaining the latter position until his appointment as noted above.

Orlando K. Morgan

D. Rounseville, assistant to the chief engineer of the Chicago & North Western, with headquarters at Chicago, has been appointed assistant engineer of maintenance of lines east of the Missouri river, with the same headquarters. **J. A. S. Redfield,** division engineer of the Northern Wisconsin division, with office at Fond du Lac, Wis., has been promoted to assistant engineer of maintenance of lines west of the Missouri river, with office at Omaha, Nebr. **T. J. Irving,** division engineer of the Southern Illinois division, with headquarters at South Pekin, Ill., has been transferred to the West Iowa division, with headquarters at Boone, Ia. **J. A. Dyer,** division engineer of the Madison division, with headquarters at Madison, Wis., has been transferred to the Iowa and Minnesota division, with headquarters at Mason City, Ia., and **W. T. Main,** division engineer of the Black Hills division and the Wyoming & North Western Railway, with headquarters at Chadron, Nebr., has been transferred to the Northern Iowa division, with headquarters at Eagle Grove, Ia. **C. J. Frederici,** general inspector of bridges, with headquarters at Chicago, has been promoted to division engineer of the Northern Wisconsin division, with headquarters at Fond du Lac, Wis., succeeding Mr. Redfield. **H. G. Lennox** has been appointed division engineer of the Southern Illinois division, with headquarters at South Pekin, Ill., succeeding Mr. Irving. **B. R. Kulp** has been appointed division engineer of the Madison division, with headquarters

at Madison, Wis., succeeding Mr. Dyer. **D. K. Van Ingen** has been appointed division engineer of the Black Hills division and the Wyoming & North Western Railway, with headquarters at Chadron, Nebr., succeeding Mr. Main. **H. M. Spahr** has been appointed division engineer on the Lake Shore division, with headquarters at Green Bay, Wis. **R. D. Anderson** has been appointed division engineer with jurisdiction over the Dakota division, the P. & Ft. P. Bridge Railway and the P. R. C. & N. W. Railway, with headquarters at Huron, S. D.

D. J. Brumley, corporate chief engineer of the Illinois Central, with headquarters at Chicago, has been appointed chief engineer, Chicago Terminal Improvements, with the same headquarters. Mr. Brumley was born near Belmore, Ohio, on March 19, 1865, and graduated from Ohio University in 1895. He entered railway service in June of that year as assistant section foreman on the Louisville & Nashville at Evansville, Ind., which position he held until 1896, when he became assistant engineer for the Columbus & Hocking Coal & Iron Company at Straitsville, Ohio. The following two years he served successively as assistant supervisor, section foreman, rodman and assistant engineer, being promoted to assistant engineer in the chief engineer's office in December, 1898. From 1901 until 1904, Mr. Brumley was roadmaster at Elizabethtown, Ky., in the latter year being appointed division engineer of the Indianapolis Southern at Indianapolis, Ind. In March, 1905, he was promoted to principal assistant engineer of the Illinois Central, the Yazoo & Misissippi Valley and the Indianapolis Southern, with headquarters at Chicago. From June, 1910, until April, 1913, Mr. Brumley was engineer of construction on these roads. He was then appointed engineer maintenance of way, which position he retained until November, 1913, when he was appointed assistant chief engineer. In April, 1914, Mr. Brumley was appointed valuation engineer, which position he held until his appointment as chief engineer of the corporation in September, 1918.

D. J. Brumley

R. J. Bond, supervisor on the Pennsylvania Railroad, with headquarters at New York City, has been promoted to division engineer of the West Jersey & Sea Shore, with headquarters at Camden, N. J. Mr. Bond was born in Upper Darby, Delaware county, Pa., on June 18, 1879, and attended Swarthmore College. He entered the service of the Pennsylvania Railroad as a rodman on the New York division in 1899, becoming assistant supervisor on the Sunbury division in 1903 and supervisor in 1905. In 1907 he was transferred to the Conemaugh division and in 1912 to the Baltimore division. On December 1, 1913, he was promoted to supervisor on the Manhattan division, and in 1916 was transferred to the New York division, from which position he became division engineer on March 1, as noted above.

W. F. Miller, supervisor on the Pennsylvania Railroad, with headquarters at West Philadelphia, Pa., has been promoted to division engineer of the Williamsport division at Williamsport, Pa. Mr. Miller was born in Philadelphia, Pa., on June 21, 1880, and was educated at Drexel Institute. He started work for the Pennsylvania Railroad in 1892 as a messenger in Philadelphia. In 1903 he was promoted to rodman in the office of the division engineer of the Philadelphia Terminal division and in 1906 went to Altoona, Pa., as a transitman, the next year being promoted to assistant supervisor. In 1908 he went to the Baltimore division as supervisor and in 1910 was transferred to the New York division. On July 15, 1913, he was appointed supervisor and assistant trainmaster at Lewisburg, Pa., and on August 1, 1914, he was transferred to the office of the valuation engineer as supervisor. On October 25, 1917, he became supervisor on the West Jersey & Seashore at Atlantic City, N. J., and the following year was transferred to the Philadelphia Terminal division in the same capacity, from which position he was appointed division engineer of the Williamsport division of the Eastern region, effective March 1, 1920.

G. W. Harris, corporate chief engineer of the Atchison, Topeka & Santa Fe System, with headquarters at Chicago, has been appointed assistant chief engineer, system, with the same headquarters. Mr. Harris has been connected with the Atchison, Topeka & Santa Fe for 23 years, having first entered the services of that company in the engineering department as a rodman in 1897 and has since served in various capacities in the engineering department, during which time he was division engineer in Colorado for a period of three years and in Texas on construction and reconstruction work for about 12 years, following which he became chief engineer of the Coast Lines at Los Angeles, Cal., a position he retained until September, 1918, when he was appointed corporate chief engineer.

C. W. Richey, assistant division engineer on the Pennsylvania Railroad, with headquarters at Pittsburgh, Pa., has been promoted to division engineer of the Pittsburgh Terminal division, with the same headquarters. Mr. Richey was born on June 27, 1872, in the city of Allegheny, Pa., now part of Pittsburgh. He began railroad work as a call boy at the Outer Depot yard of the Pittsburgh, Fort Wayne & Chicago, now a part of the Pennsylvania. In 1888 he was made telephone boy at the old Union Depot at Pittsburgh, becoming yard clerk at Outer Depot in 1889. He left the service of the railroad the latter part of that year, but returned the following year to the Pittsburgh, Fort Wayne & Chicago as an axeman in the office of the chief engineer, later being made chainman on a preliminary survey along Little Beaver Creek, Ohio. On his return from this survey he entered Park Institute, Allegheny, Pa., and one year later entered the University of Western Pennsylvania, now the University of Pittsburgh, from which he was graduated in 1895. He then went to Colorado as a transitman with a mining engineer, but returned to Pittsburgh that winter to become a structural draftsman for the Keystone Bridge Works, leaving that company on February 10, 1900, to return to the Pennsylvania Railroad as master carpenter of the West Pennsylvania division, being promoted to master carpenter of the Pittsburgh division in November, 1905. He was promoted to assistant division engineer of the Pittsburgh division on February 1, 1918, from which position he was made division engineer of the Pittsburgh Terminal division of the Central region at Pittsburgh, Pa., as noted above.

G. C. Koons, assistant division superintendent on the Pennsylvania Railroad, with headquarters at Mifflintown, Pa., has been promoted to assistant chief engineer, with headquarters at Philadelphia, Pa. **B. V. Sommerville** has been appointed assistant to the chief engineer with headquarters at Detroit, Mich. **M. Lipman,** division engineer of the West Jersey & Sea Shore, with headquarters at Camden, N. J., has been transferred to the Philadelphia Terminal division, with headquarters at Philadelphia, Pa. **E. J. Ayars,** division engineer at Williamsport, Pa., has been transferred to the Panhandle division, with headquarters at Pittsburgh. **J. H. Harris,** principal assistant engineer on the Pennsylvania Railroad, with headquarters at New York, has been appointed engineer maintenance of way of the New Jersey division with the same headquarters. **J. H. Nichol,** principal assistant engineer, with headquarters at Williamsport, Pa., has been appointed engineer maintenance of way of the Central Pennsylvania division, with the same headquarters. **C. P. MacArthur,** principal assistant engineer, with headquarters at Buffalo, N. Y., has been appointed engineer maintenance of way of the Northern division, with the same headquarters. **W. T. Covert,** principal assistant engineer, with headquarters at Pittsburgh, Pa., has been appointed engineer maintenance of way of the Western Pennsylvania division, with the same headquarters. **Fred H. Watts,** division engineer on the Pennsylvania Railroad, with headquarters at

Pittsburgh, Pa., has been promoted to engineer maintenance of way of the Illinois division, with headquarters at Chicago, Ill. **W. R. Hillary,** supervising engineer, with headquarters at Toledo, Ohio, has been promoted to engineer maintenance of way of the Northern Ohio division, with the same headquarters.

B. Robert Kulp, trainmaster on the Galena division of the Chicago & North Western, with headquarters at Chicago, has been appointed division engineer of the Madison division, with headquarters at Madison, Wis. Mr. Kulp was born at Duncannon, Pa., in 1883, and graduated from Rensselaer Polytechnic Institute in 1905 as a civil engineer, entering railway service with the Chicago & North Western as an instrumentman that year. From 1907 to 1908 he served as a draftsman on that road and in 1909 was promoted to assistant engineer on bridge work. The next three years he served as assistant engineer in charge of construction and in 1913 was promoted to division engineer of the Ashland division, with headquarters at Antigo, Wis. From 1917 to 1919 he was a trainmaster on the Illinois division, with headquarters at Benld, Ill., and in the latter year was transferred to the Galena division.

Rudolf P. Forsberg, who has been promoted to principal assistant engineer of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., effective March 1, was born at Lynchburg, Va., in November, 1870. He entered railroad work as a rodman in June, 1887, on the Lynchburg & Durham, now part of the Norfolk & Western. In 1888, he became a rodman on the Richmond & Danville, now part of the Southern Railway, being promoted to levelman and transitman in 1889. During construction of the Yadkin division of this road in 1890 and 1891 he was resident engineer, with office at Salisbury, N. C., leaving the employ of that road in 1891 to become draftsman in the office of Charles Read, architect, at Richmond, Va., returning the following year to the Norfolk & Western as draftsman in the office of the engineer maintenance of way at Roanoke, Va. In September, 1892, he left that company to go with the New York Central Lines as draftsman in the office of engineer maintenance of way of the Pittsburgh & Lake Erie at Pittsburgh, Pa., later being transferred to the office of the chief engineer in the same capacity. In March, 1899, he was made chief draftsman at Pittsburgh and in 1902 was appointed assistant engineer at the same place, being promoted to the position of special engineer in July, 1919, from which position he was promoted to principal assistant engineer as noted above.

Rudolf P. Forsberg

Walter H. Raleigh, who has been appointed division engineer of the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., as noted elsewhere, was born at Paducah, Ky., on October 20, 1887. He entered railway service on August 6, 1906, with the Missouri, Kansas & Texas as an axman, serving later as chainman and rodman. From September, 1909, until March, 1910, he was rodman on the Galveston, Harrisburg & San Antonio, and from the latter date until October, 1910, served as instrumentman on land subdivision and drainage in Matagorda County, Texas. He returned to the Galveston, Harrisburg & San Antonio as rodman in October, 1910, and in March, 1911, was promoted to foreman of a floating gang. From November, 1913, to June, 1915, Mr. Raleigh served successively as assistant foreman of yards and extra gangs and foreman of extra and steel gangs. He left this road in June, 1915, to go with the Missouri, Kansas & Texas as roadmaster, which position he held until June, 1918, when he was appointed general foreman maintenance of way. He served with the American Expeditionary Forces as second lieutenant from July 12, 1918, to May 5, 1919, being promoted to first lieutenant at the latter date. On November 4, 1919, he returned to the Missouri, Kansas & Texas as roadmaster, which position he retained until his appointment as noted above.

Joseph B. Baker, supervisor on the Pennsylvania Railroad, with office at Philadelphia, Pa., has been promoted to engineer maintenance of way of the Lake division, with headquarters at Cleveland, Ohio. Mr. Baker was born on December 20, 1882, and completed his education at the University of Pennsylvania, being graduated in 1905. He entered the service of the Pennsylvania Railroad on July 1 of that year as rodman in the construction department. He was transferred to the maintenance of way department in the following year and on April 1, 1919, was made transitman at Altoona, Pa., being advanced to assistant supervisor at Watsontown, Pa., in 1910, and to Newport, Pa., in 1913. On February 1, 1916, he was promoted to supervisor in the office of the assistant to general manager and in June, 1918, was appointed main line supervisor under the engineer maintenance of way, being made main line supervisor under the assistant to the general manager in September of that year, from which position he was appointed engineer of maintenance of way of the Lake division of the Central Region in March, 1920, as noted above.

C. E. Brinser, assistant division superintendent on the Pennsylvania Railroad, with office at Trenton, N. J., who has been appointed engineer of maintenance of way of the Eastern Pennsylvania division, with headquarters at Harrisburg, Pa., was born at Elizabethtown, Pa., on December 3, 1881, and attended Franklin and Marshall College. He entered railway service in April, 1900, as a rodman in the construction department of the Philadelphia division of the Pennsylvania Railroad and served successively as transitman at Altoona, Pa., to 1903, assistant supervisor on the Trenton division from the end of 1903 to April, 1907, and supervisor on the Delaware division. In August, 1910, he was promoted to division engineer of the New York, Philadelphia & Norfolk, subsequently being transferred to the Camden Terminal division, in 1913 to the West Jersey & Seashore; to the Williamsport division in December, 1914; to the Monongahela division in September, 1916; to the Middle division in April, 1917, and to the Philadelphia Terminal division on October 25, 1917. He was promoted to assistant superintendent of the New York division, with office at Jersey City, N. J., on September 1, 1918, later being made assistant division superintendent at Trenton, N. J., from which position he was appointed engineer maintenance of way, as stated before.

C. E. Brinser

F. D. Davis, assistant freight trainmaster on the Pennsylvania Railroad, has been appointed division engineer of the New York division of the Eastern region, with headquarters at New York. Mr. Davis was born at Baltimore, Md., on March 21, 1885, and was educated at the Baltimore Polytechnic Institute. He entered the service of the Pennsylvania Railroad in June, 1903, as levelman on the Delaware division, becoming rodman on the Baltimore division in March, 1905, transitman in the office of the principal assistant engineer maintenance of way in June, 1906, and assistant supervisor on the Central division the following June, from which division he was transferred to the Cresson division in November, 1909, and again to the New York division

in May, 1910. On June 16, 1913, he returned to the Cresson division, having been promoted to supervisor. He was subsequently transferred to the Sunbury division in September, 1916, and to the Trenton division in November, 1917. On April 1, 1918, he was appointed assistant freight trainmaster, from which position he became division engineer, as stated above, on March 1, 1920.

R. R. Nace, assistant engineer of maintenance of way on the Pennsylvania Railroad, whose appointment as assistant engineer was incorrectly announced in the March issue of the *Railway Maintenance Engineer*, has been promoted to engineer maintenance of way of the Ohio division of the Central region. Mr. Nace was born at Tacony, Pa., on August 27, 1882, and was graduated from the Northeast Manual Training School in 1900. He entered the employ of the Pennsylvania Railroad in December, 1901, serving successively as rodman, assistant supervisor and supervisor. In 1914 Mr. Nace was transferred from the Buffalo division, where he acted in the capacity of supervisor in the office of the valuation engineer at Philadelphia, and on December 1, 1917, was appointed supervisor of the Philadelphia Terminal division, becoming agent of that division in 1918. On March 1, 1919, he was made assistant engineer of maintenance of way, reporting to the assistant to the president, remaining in this position until his recent promotion, as noted above.

H. H. Garrigues, division engineer on the Pennsylvania Railroad, with headquarters at West Philadelphia, Pa., has been promoted to engineer of maintenance of way of the Southern division of the Eastern region, with headquarters at Wilmington, Del. Mr. Garrigues was born on September 4, 1881, and attended Haverford College for about a year and a half. He entered the service of the Pennsylvania Railroad in February, 1901, as a rodman on the Belvidere division, becoming transitman in 1903, assistant supervisor in 1904 and supervisor in 1908. On June 1, 1914, he was transferred to the office of the assistant to the general manager and in January of the following year was transferred to the office of the valuation engineer. In May, 1917, he was appointed supervisor on the Baltimore division and was transferred to the Philadelphia division in September of that year. In May, 1918, he was promoted to the position of division engineer of the Trenton division, transferring in February, 1909, to the Philadelphia Terminal division, where he remained until his recent promiotion, as noted above.

Porter Allen, supervisor on the Middle division of the Pennsylvania Railroad, with headquarters at Huntington, Pa., has been promoted to division engineer of the Cleveland & Pittsburgh division of the Central Region, with office at Cleveland, Ohio. Mr. Allen was born on August 15, 1880, at Williamsport, Pa., and was graduated from Lafayette College in 1902. He entered the employ of the Pennsylvania Railroad as a rodman in the principal assistant engineer's office at Williamsport, Pa., on June 21, 1902, and was transferred to Elmira, N. Y., on August 1 of that year, becoming transitman at Altoona, Pa., three years later. On March 10, 1906, Mr. Allen was advanced to assistant supervisor at Washington, Pa., and in September, 1908, was transferred to Lancaster, Pa., being promoted to supervisor at Uniontown, Pa., on August 1, 1911. On May 1, 1915, he was transferred to Olean, N. Y., on the Buffalo division, again being transferred on September 16, 1918, to the Middle division, from which place he was promoted to division engineer, as stated above.

J. G. Hopkins, supervisor on the Pennsylvania Railroad, with headquarters at Lamokin, Pa., has been promoted to division engineer of the Monongahela division at Pittsburgh, Pa. Mr. Hopkins was born on July 29, 1879, and was educated at Williamsport Commercial College. He entered the service of the Pennsylvania Railroad in December, 1901, as supervisor's clerk at Williamsport, Pa., and two years later was made rodman in charge of the drafting room at the same place. In September, 1905, he became transitman at Altoona, Pa., being promoted to assistant supervisor at Lock Haven, Pa., on March 7, 1906. On April 20, 1909, he was transferred to Conemaugh, Pa. He was promoted to the position of supervisor at Millersburg, Pa., on May 1, 1912. From May 1, 1915, to July, 1917, he was pilot engineer in the office of the valuation engineer at Philadelphia, from which position he was transferred to Buffalo, N. Y., as supervisor, and five months later was again transferred to the Maryland division, remaining in this position until his recent promotion, as noted above.

C. E. Dare, supervisor on the Richmond, Fredericksburg & Potomac, with headquarters at Fredericksburg, Va., has been promoted to resident engineer, with headquarters at Richmond, Va., succeeding **E. M. Hastings,** who was promoted to principal assistant engineer, as noted in last month's issue.

TRACK

John Hubenthal has been appointed roadmaster on the Chicago, Milwaukee & St. Paul, with headquarters at Beloit, Wis., in place of **R. A. Erdman,** resigned.

T. J. Harvey has been promoted to roadmaster on the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa., succeeding **W. Cummings.**

G. A. Thomas, transitman on the Richmond, Fredericksburg & Potomac, has been promoted to supervisor, with headquarters at Fredericksburg, succeeding **C. E. Dare,** promoted, as noted elsewhere.

A. W. Peterson, formerly roadmaster on the Missouri, Kansas & Texas of Texas, with headquarters at Smithville, Tex., has been appointed roadmaster on the Missouri, Kanhas & Texas, with headquarters at Columbus, Mo.

J. Bristow, assistant track supervisor on the Pere Marquette, has been promoted to track supervisor of the Saginaw Bay City terminal, and **Henry Steinmetz** has been appointed assistant track supervisor, succeeding Mr. Bristow.

T. R. Paterson has been appointed roadmaster on the Great Northern, with headquarters at Park Rapids, Minn., succeeding **P. F. Walsh,** resigned, and **Fred Felton** has been appointed roadmaster, with headquarters at Watertown, S. D., in place of **T. Rasmussen,** assigned to other duties.

Mike McShane has been appointed to the newly created position of roadmaster on the Superior-Mesabi division of the Great Northern, with jurisdiction over the territory between Brookston and Olcott and between Swan River and Kelley Lake, with headquarters at Kelley Lake, Minn.

M. E. Loftis, roadmaster on the Missouri, Kansas & Texas, with headquarters at Muskogee, Okla., has been transferred to the Missouri, Kansas & Texas of Texas, with headquarters at Dallas, Tex. **J. H. Griffith,** roadmaster at Hillsboro, Tex., has been transferred to Denison, Tex. **O. E. Cherry** has been appointed roadmaster on the Texas Central district, with headquarters at DeLeon, Tex.

P. Montgomery, division roadmaster on the Dakota division of the Great Northern, with jurisdiction over the lines between Crookston and Grand Forks and between Grand Forks and Morden, with headquarters at Grand Forks, No. Dak., has been transferred to the Sioux City division, with headquarters at Sioux City, Iowa, succeeding **S. O. Lund,** who has been transferred to Grand Forks in place of Mr. Montgomery.

C. E. Kemp has been promoted to roadmaster on the Chicago, Milwaukee & St. Paul, with headquarters at Sioux Falls, S. D., succeeding **H. V. Lange.** Mr. Kemp was born at Bement, Ill., on October 23, 1878, and entered railway service on October 1, 1897, with the Chicago, Rock Island & Pacific as a section laborer. From March 1, 1899, to August 27, 1900, he served as a section laborer on the Des Moines division of the Chicago, Milwaukee & St. Paul, being promoted to section foreman on the same division at the latter date. Mr. Kemp remained in this capacity until April 1, 1909, when he was transferred to the Puget Sound extension as a foreman of construction work. He returned to the Des Moines division on December 1, 1911, as section and extra gang foreman, which position he held until April 1, 1918, when he was transferred to the Rochelle & Southern division as extra gang foreman and assistant roadmaster. On November 12, 1918, Mr. Kemp was transferred to the Sioux City & Dakota division as extra gang foreman and assistant roadmaster, which position he held at the time of his promotion as noted above.

PURCHASING AND STORES

L. V. Guild has been appointed purchasing agent of the Union Pacific, succeeding **G. H. Robinson,** transferred.

J. F. Marshall has been appointed purchasing agent of the Chicago & Alton, with headquarters at Chicago, succeeding **V. M. Alexander.**

W. J. Diehl, general storekeeper of the Mobile & Ohio, with headquarters at Mobile, Ala., has been appointed purchasing agent, with the same headquarters, succeeding **J. A. Turner,** resigned. The office of general storekeeper has been abolished.

OBITUARY

T. H. Hickey, inspector maintenance of way of the Michigan Central, with headquarters at Detroit, Mich., died on April 10 at his home in Detroit. Mr. Hickey was born in Ireland on October 2, 1852, and entered railway service in 1872 with the Ft. Wayne & Jackson. He entered the employ of the Michigan Central in 1881 as an extra gang foreman and one year later was promoted to assistant roadmaster on the Eastern division. In 1884 he was promoted to division roadmaster and in 1892 was transferred to the Canadian division in the same capacity. In July, 1916, Mr. Hickey was appointed track inspector, which position he held at the time of his death. Mr. Hickey had long been active in the American Railway Engineering Association and the Roadmasters' Association, having been president of the latter association in 1899.

W. H. Wells, chief engineer of construction of the Southern, with headquarters at Washington, D. C., died at Athens, Ga., on April 13. Mr. Wells was born on May 7, 1852, at Dalton, Ga., and received his education at the University of Georgia. He entered railway service in 1868 as a rodman for the Savannah & Memphis, now part of the Central of Georgia, later serving as levelman and transitman. In 1871 he was appointed assistant engineer, which position he held until 1872, when he was appointed locating engineer. From 1874 until 1876 he was associated with the United States engineering department, with headquarters at Chattanooga, Tenn., leaving in the latter year to go with the Marietta & North Georgia, now part of the Louisville & Nashville. In 1878 Mr. Wells was appointed division engineer on the Louisville & Nashville, and in 1880 he went to the New Orleans Pacific, now part of the Texas & Pacific, in the same capacity. In 1883 he was appointed locating engineer of the Mississippi & Rio Grande, in which capacity he served until 1886 when he was appointed district engineer of the Mobile & Ohio. In 1887 he entered the employ of the St. Louis, Arkansas & Texas, now part of the St. Louis Southwestern, in the same capacity, leaving this road in 1890 to become chief engineer of the Georgia Southern & Florida, shortly afterwards taking office in New York as a consulting engineer. He was appointed construction engineer of the Southern in 1895.

Penalty for Inadequate Maintenance.—The Louisiana Railway & Navigation Company has been fined $1,000 for violation of the terms of the Commission's order requiring the company to "repair and place in a safe and satisfactory condition its entire roadbed, including switches, crossties, rails, bridges, frogs, trestles and any and all portions of said railroad by replacing such defective material as may be necessary and renewing such parts of bridges and tracks as may appear to be in an unsafe condition, within a period of 120 days.

The production of Portland cement increased 13 per cent in 1919 as indicated by preliminary statistics issued by the United States Geological Survey. During the same year the shipments increased 21 per cent and the stocks decreased 52 per cent. The production during 1919 was 80,287,000 bb., while the shipments aggregated 85,485,000 bb. and the stocks on hand at the mill at the end of the year aggregated 4,976,000 bb. The total number of plants in operation was 110. The average factory price per barrel for Portland cement in bulk was $1.69, an increase of 6 per cent over the previous year. The exports of hydraulic cement from the United States in 1919 amounted to 2,463,689 bb., valued at $7,516,019, or approximately $3.05 per bb.

CONSTRUCTION NEWS

The Central of Georgia has given a contract to the George B. Swift Company, Chicago, to build an outbound freight house and transfer shed at Macon, Ga. The former will be of reinforced concrete construction, about 800 ft. long, and the latter of wood construction about 600 ft. long. These two structures are part of the plan for a complete freight terminal, but the remaining buildings will not be built at present. The work has already been started and will cost about $150,000.

The Erie has awarded a contract to the Arthur McMullen Company, New York, for the removal of the present bridge over the Passaic river at Newark, N. J., and the building of the substructure for a new double-track bascule bridge of the Strauss type. A preliminary notice of this project appeared in last month's issue.

The Newburgh & South Shore will start work at once on the erection of a steel car repair shop at Marcelline avenue, Cleveland, Ohio, at an estimated cost of $265,600. The main shop will consist of a building 250 ft. long and 70 ft. wide, with four tracks and an overhead crane reaching across all the tracks for the entire length of the building. An annex 40 ft. by 250 ft. for machinery will also be put up. The buildings will be of brick and steel construction.

The Lehigh Valley has begun construction work on the initial unit of an ocean terminal on New York Bay in the Greenville section of Jersey City, N. J., which will be known as Claremont Terminal. The first unit will be a 3,000-ft. wharf near the foot of Chapel avenue, Jersey City. To reach it from deep water a 35-ft. channel is now being dredged. This will require the removal of 3,500,000 cu. yd. of material. Ultimately the terminal will cover about 550 acres of ground, and be about eight times the size of the first unit. The dock space in the completed project will be about six miles in length.

The New York, New Haven & Hartford has resumed construction of the large freight terminals at Cedar Hill (New Haven), Conn., and Providence, R. I., and it is expected that the work will be largely completed by the close of the season.

The Quebec Central has given a contract to J. T. & J. F. Davis, Montreal, Que., to build a branch from Scotts' Station, Quebec, on the main line, for a distance of 8 miles to a point 2.5 miles west of St. Isidore on the Canadian National Railways. The branch is to be built to provide a connection for the Quebec Central with Quebec City over the Quebec bridge. There will be one steel bridge 125 ft. long and a station at St. Isidore Junction.

The Pittsburgh & Shawmut will let contracts in the near future for the construction of a 40 ft. by 160 ft. storehouse with offices for the mechanical department at Brookville, Pa., and for lining the Mauck tunnel on the same line, 2,000 ft., with concrete.

EQUIPMENT AND SUPPLIES

Dutilh-Smith, McMillan & Co., 50 Broad street, New York, are inquiring for 1,000 pieces, about 150 ton, of 50-lb. rail, 20 per cent to be 7 meter lengths, the balance in five to six meter lengths. This firm recently ordered 300 tons of relaying rail for export.

The Northern Pacific has ordered 300 ballast cars of 55 tons' capacity from the American Car & Foundry Company.

Sophus Berendson, Inc., 15 Broad street, New York, has ordered 200 tons of 128-lb. rail and accessories from the United States Steel Products Company for export to Denmark.

The Southern Pacific is inquiring for 500 ballast cars.

The Union Pacific has ordered three 15-ton cranes for handling coal from the Browning Company, Cleveland, Ohio, and has also ordered three cranes equipped with electromagnets of 15 tons' capacity from the Industrial Works, Bay City, Mich.

SUPPLY TRADE NEWS

GENERAL

The H. K. Ferguson Company, engineers and builders, Cleveland, Ohio, has opened an office at 21 West Forty-third street, New York, in charge of **L. D. Stauffer.**

The Merchant & Evans Company, Philadelphia, Pa., has opened a branch office in the Chamber of Commerce building, Detroit, Mich., in charge of **R. Frank Smith,** who has been a salesman and branch manager for this company for nearly 20 years.

The All Weather Products Company, of Streator, Ill., has undertaken the manufacture of "stay white" asbestos coatings for felt or composition roof and various paints and weather-proofing materials. **Charles V. Eades** is head of the new concern.

Joseph T. Ryerson & Son, Chicago, have made an arrangement with the Camden Iron Works, Camden, N. J., to become the selling representatives of the latter company, which is engaged in manufacturing hydraulic tools, centrifugal pumps, cast iron pipe and fittings, gas holders and kindred products.

The Oxweld Acetylene Company, Newark, N. J., has taken over the manufacture of the Prest-O-Lite welding and cutting equipment. This apparatus, with certain refinements of design, is now being manufactured by the Oxweld Acetylene Company under the name of Eveready welding and cutting outfits.

The Hyatt Roller Bearing Company, New York, has moved its industrial bearings division, **D. Gleisan,** manager, from 1 Madison avenue to 100 West Forty-first street, New York, where much larger headquarters have been secured for the advertising, sales and engineering department of the division.

The Strauss Bascule Bridge Company of Chicago has been retained to design the bascule span on the joint railway and highway bridge over Inner Harbor at Johnston street by the city of Victoria, British Columbia. The cost will be borne jointly by the city of Victoria, the provincial government of British Columbia, and the Canadian Pacific.

The Carborundum Company, Niagara Falls, N. Y., is extending and improving its plant at Niagara Falls and its two furnace plants, one at Niagara Falls, Ont., and the other at Shawinigan Falls, Que., to the extent of $500,000. A three-story addition to the paper and cloth plant at Niagara Falls, 432 ft. long and 81 ft. wide, has just been finished and a building, two stories high, 96 ft. long and 64 ft. wide, has been added to the wheel-making and kiln departments, both buildings being of concrete and of the most modern type. Other large extensions and improvements are planned and work will be started immediately.

The Chicago Pneumatic Tool Company moved its general offices on March 31 from Chicago to the Chicago Pneumatic building, a new 10-story structure erected for the exclusive use of the company at 6 East Forty-fourth street, New York. The Chicago district sales branch, previously in the Fisher building, has been moved to new quarters at 300 North Michigan boulevard. The Chicago service branch, formerly at 521 South Dearborn street, has been consolidated with the sales branch at the new address, occupying the first floor of the building, while the sales offices will be on the second floor or boulevard level. Both departments of the Chicago branch are under the direction of **J. L. Canby,** district manager.

PERSONAL

Roger C. Sullivan, chairman of the board of directors of the Independent Pneumatic Tool Company, Chicago, died on April 14.

R. Rivett, supervisor of car repairs for the United States Railroad Administration during the period of government control, has been appointed district manager of the Oxweld Railroad Service Company, with headquarters at Chicago. Mr. Rivett was connected with the Chicago, Burlington & Quincy for a period of 21 years, later serving as general car inspector on various railroads until 1918, when he became supervisor of car repairs for the United States Railroad Administration.

Fred J. Passino, southwestern representative for the Independent Pneumatic Tool Company, Chicago, has been appointed assistant manager of the eastern division, with headquarters at 1463 Broadway, New York.

Karl J. Eklund, general manager of Mudge & Co., has been elected vice-president in charge of sales and service. In this capacity Mr. Eklund will also have charge of western sales for the Pilliod Company, Swanton, Ohio, and the Chambers-Lyle Company. Mr. Eklund was born on July 8, 1884, and entered railroad service as a blacksmith's helper in the shops of the Boston & Maine. After three years as an apprentice machinist, he was employed on various railroads as a journeyman machinist. In 1908 he returned to the Boston & Maine as machinist and foreman in the Keene, N. H., shops, and on March 1, 1910, he became connected with the Pilliod Company as a valve gear inspector. On February 1, 1915, he was appointed assistant to the president of the Pilliod Company, with headquarters at New York City. He occupied this position until April 1, 1917, when he was appointed assistant to the president of Mudge & Co., Chicago, which position he held until his appointment as general manager on March 1, 1918.

Karl J. Eklund

Charles H. McCullough, Jr., president of the Lackawanna Steel Company, Buffalo, N. Y., died on April 3 in Baltimore, Md. Mr. McCullough had been president of the Lackawanna Steel Company since January 1, 1919, at which time he succeeded E. A. S. Clarke, who became president of the Consolidated Steel Company, organized by several steel companies to handle export business. He was born on December 25, 1868, at Philadelphia, Pa., and graduated from Stevens Institute of Technology, Hoboken, N. J., with the degree of mechanical engineer. He was in the service of the Illinois Steel Company for 14 years and when he left had risen to the position of second vice-president of the company. He then went to the Lackawanna Steel Company and served for 12 years as vice-president and general manager until January 1, 1919, when he was elected president of the same company. Mr. McCullough during 1919 was elected a director of the American Iron and Steel Institute, in the work of which he took an active interest for many years. He was a director of the Consolidated Steel Company, the Pierce-Arrow Motor Car Company and other industrial organizations.

Charles H. McCullough, Jr.

R. T. Walsh, general sales manager of the Sullivan Machinery Company, Chicago, for the past eight years, has been appointed vice-president in charge of sales and has also been elected a director. Mr. Walsh was born in Massachusetts and received his education at Worcester Polytechnic Institute, graduating in 1900. He entered the service of the Sullivan Machinery Company at Claremont, N. H., and after several months was assigned to the western branch of the company at Denver, Colo., as a salesman. In 1906 he was appointed Pacific Coast manager, with headquarters at San Francisco, Cal. He was promoted to European sales manager, with headquarters at London, Eng., five years later, and in 1913 he was apointed as general sales manager, which position he held until his recent promotion.

Robert Sinclair, vice-president of Mudge & Co., Chicago, has been elected executive vice-president in charge of all departments, including the manufacturing plant recently constructed in Chicago. Mr. Sinclair was born at Chicago on April 12, 1878, and entered railway service in the auditing department of the Chicago & Eastern Illinois in 1892. The following year he took a position with the operating departments of the Columbian Intramural railway at the Chicago World's Fair. At the close of this exposition he entered the service of the Union National Bank of Chicago and remained with it until its consolidation with the First National Bank in 1900, when he went with the larger institution. He left the banking business on September 1, 1910, to become secretary and treasurer of Mudge & Co. On June 9, 1912, he was elected second vice-president of this company, later being made first vice-president. On November 1, 1916, he was appointed vice-president in charge of the sales, manufacturing and treasury department, which position he has held until his recent appointment.

Robert Sinclair

J. J. Thomas, Jr., superintendent of motive power and car equipment of the Mobile & Ohio at Mobile, Ala., has entered the service of The Oxweld Railroad Service Company as district manager, with headquarters at Mobile. Mr. Thomas entered railway service in 1881 as a fireman with the Selma, Rome & Dalton Railroad, later becoming machinist apprentice on the same road at Selma, Ala. From 1885 to 1898 he was successively locomotive engineer, machine shop foreman, general foreman and master mechanic of the Birmingham & Atlantic Railroad, resigning to accept a position as master mechanic of the Mobile & Ohio at Tuscaloosa, Ala., later becoming assistant superintendent of motive power and car equipment of this road, with headquarters at Mobile. In 1902 Mr. Thomas left the Mobile & Ohio to take a position as master mechanic on the Seaboard Air Line at Savannah, Ga., and resigned from the service of this road to become master mechanic on the Atlantic Coast Line at South Rocky Mount, N. C. In 1909 he returned to the Mobile & Ohio to become superintendent of motive power and car equipment, which position he held up to the time of his recent appointment.

J. J. Thomas, Jr.

TRADE PUBLICATIONS

Barrett Everlasting Fiber Coating.—The Barrett Company, New York, has issued an 8-page folder describing the various uses for Everlasting fiber coating, as manufactured by this company, for waterproofing or changing old roofing.

Standardized Concrete.—The Koehring Machine Company, Milwaukee, Wis., has issued a 20-page pamphlet reviewing recent tendencies in concrete mixing practice and calling attention to the special facilities of the Koehring mixer for controlling the amount of water, for insuring thorough mixing and for controlling the time that each batch is in the mixer.

Anti-Corrosion Engineering.—The National Tube Company, Pittsburgh, Pa., recently issued a four-page illustrated folder, which is a reprint from an article by Prof. W. H. Walker on the subject of a practical method for preventing corrosion in steam and hot water pipes. This deals with a chemical action of hot water and steam on pipes and shows a practical method whereby the life of steam and hot water pipes may be prolonged.

Steel Tanks for Railway Service.—The Chicago Bridge & Iron Works, Chicago, has recently issued a 24-page illustrated folder, which is descriptive of the tanks manufactured by this company for railway installations. It is illustrated by photographs showing views of actual installations with various designs suitable for different classes of service. The accompanying data give values, capacities, methods of operating, control appliances, and such other information descriptive of the same.

Elesco Superheater for Steam Shovel.—Two four-page illustrated bulletins, known as No. T-3 and T-4, have been recently issued by the Locomotive Superheater Company, New York, which deal with the application of the fire tube superheaters, manufactured by this company, to steam shovels. These bulletins describe the advantages to be derived through the use of superheaters and give some data on the results which have been obtained by their use. The illustrations show steam shovels which are so equipped and include drawings indicative of typical installations.

Welding Torches.—The Air Reduction Sales Company has issued a new catalog describing Airco "A" and "B" welding torches. The booklet has been designed to give a clear exposition of the principles of torch operation involved in the construction of the Airco apparatus and the influence of these principles on good welding. The catalog is illustrated with half-tone reproductions of the torches, angles of heads, tips, etc. Tables are given showing the thicknesses of metal that can be welded by the different tips supplied with each torch, pressures required, speed of welding in feet per hour, gas consumption in cubic feet per hour, etc.

Where a railroad company or other person, by temporary or permanent structures or fills built in a stream, obstructs the channel and thereby diverts the regular flow of the waters therein, resulting in occasional damages to the lands of a riparian owner, such damages in contemplation of law are temporary, as distinguished from permanent damages, and recovery therefor is limited to the damages as from time to time occurs. In the trial of an action for such impermanent damages the West Virginia Supreme Court of Appeals holds it is error to admit evidence of prospective or future damages liable to be sustained by the owner.

The Michigan Supreme Court holds that where a railroad has built on its right of way switching and storage tracks crossing city streets without the city's permission, and has continued to use the tracks for six years without objection, the city is estopped from requiring the railroad to remove its tracks. It is also held that a railroad which has incurred considerable expense in building sidings on its right of way before a city council rescinds its resolution granting permission to cross city streets, will be permitted to complete the tracks by extending them to its main track, so as to relieve the situation.